

ÆTNA  
ACCIDENT PREVENTION  
SERVICE

AS EXEMPLIFIED AT

PANAMA-PACIFIC INTERNATIONAL EXPOSITION,  
SAN FRANCISCO, CAL.

PANAMA-CALIFORNIA EXPOSITION,  
SAN DIEGO, CAL.

1915



ÆTNA LIFE INSURANCE COMPANY  
ACCIDENT AND LIABILITY DEPARTMENT  
HARTFORD, CONN.



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## PREFACE.

The exhibits which are described and illustrated in this pamphlet were designed to fulfil a double purpose — to exemplify the work in accident prevention which our Company does in connection with its Liability and Workmen's Compensation Insurance, and to stimulate interest in accident prevention on the part of those visiting the two expositions of which these exhibits form a part.

We believe that the accident prevention service rendered in connection with ÆTNA Liability and Workmen's Compensation Insurance is one of the most important features of that insurance. There can be no question, we think, that the employer, as well as the employe, and society at large, are more vitally interested in the prevention of accidents than in the means of taking care of accidents which actually happen. And this on practical as well as humanitarian grounds. Prevention of accidents promotes efficiency, in that it tends to keep a working force intact and at its highest point of usefulness.

We think that the accident prevention work done by the ÆTNA, as exemplified in these exhibits, gives most convincing evidence of the high quality of social service which can be rendered by an insurance company engaged in Liability and Workmen's Compensation business. And we have been gratified to find support for this thought in the fact that our exhibits at the Panama-Pacific and Panama-California Expositions have each received the award of grand prize, the highest distinction that the expositions could confer upon them.

We wish to take this opportunity of thanking the authorities of the Panama-Pacific and Panama-California Expositions for inviting us to exhibit and of gratefully acknowledging our indebtedness to the many manufacturers of machinery and safety devices who have kindly loaned us machines and safeguards included in our exhibits.

ÆTNA LIFE INSURANCE COMPANY.





Fig 1. General View of Exhibit at San Francisco.

The Bureau of Inspection and Accident Prevention of the Aetna Life Insurance Company has taken part in many expositions, but never before has any insurance company undertaken to display such complete and instructive exhibits of practical accident prevention methods as those shown by this Bureau in 1915 at the Panama-Pacific International Exposition, San Francisco, and the Panama-California Exposition, San Diego. The comprehensive character of these exhibits is well illustrated by the amount of space which they required for their proper display, the San Francisco exhibit for instance, occupying a floor area of 1,200 square feet, in Block 13 of the Palace of Mines and Metallurgy. Even this considerable amount of space proved barely sufficient to show the great amount of material included in the exhibit, the total weight of which as shipped from the Home Office at Hartford, Connecticut, to San Francisco, exceeded thirty tons.

This material covers the whole broad subject of accident prevention work from every standpoint. Both the physical side and the part played by organization and education are featured, as they should be in any comprehensive showing of the possibilities of accident prevention.

#### GENERAL FEATURES OF EXHIBIT.

The exhibit at San Francisco includes:

A machinery platform showing a number of full-sized machines in operation and safeguarded according to approved modern methods;

A miniature factory model showing a well-equipped and safeguarded factory on one side and on the other a factory lacking both good equipment and safeguards;

A synchronized stereomotorgraph and phonograph, showing and describing a general collection of safety photographs;

Classified collections of photographs showing practical safety devices as used in different industries;

Photographs illustrating safe and unsafe ways of doing work in different industries;

Samples of guards of various types, showing proper materials and suitable methods of construction;

Tables containing safeguards for various kinds of work;

Charts showing organization plans for safety work in plants of different sizes;

Charts showing reduction in accidents accomplished by safety work;

Charts showing accident frequency in various lines of industries;

Safety publications issued by the Aetna Life Insurance Company.



### MACHINERY PLATFORM.

The feature of the San Francisco exhibit which is perhaps most likely to attract the first attention of those visiting it is the machinery platform, on which are shown a number of full-sized, modern, motor-driven machines, fully safeguarded and actually running. These machines and all the necessary shafting, etc., are securely mounted on a heavy wooden framework. The platform is thirty feet long, five feet wide and eight feet high. It is constructed of birch wood, securely jointed and bolted together in such a manner as to permit its easily being dismantled and re-erected as desired. The platform and framework were not a part of the exposition building, but were built at large expense in Hartford, Connecticut, and shipped to San Francisco. This machine frame stands out prominently in the pictures of the exhibit as a whole, shown in Figs. 1 and 4.

The machines in operation on this platform consist of punch presses, lathes, drill-presses, etc., and there are also shown cone and tight and loose belt shifters of various kinds. All of the machines and equipment shown on the platform are equipped with simple and practical safeguards, most of which were made by the Inspection Department of the Company.

A large electric motor supplies power for driving most of the machinery on this frame. The motor is completely enclosed in an angle iron and wire mesh frame with hinged doors, as shown in Fig. 2. The main driving belt is also enclosed by a similar guard to a height of 6 feet. This guard is provided with a removable door allowing access to the belt when necessary.

Fig. 3 shows the largest and most powerful machine exhibited. It is a punch press equipped with a dial feed, which allows the work to be fed to the press and the finished article removed without it being necessary for the operator's hands to come near the ram. The machine is also guarded by angle iron and wire mesh protection in front of the ram in such a way as to make it impossible for the operator's fingers to get under the ram. A mica plate is placed in the front part of this guard so that the operations can be readily observed. Small leather flaps are placed at the bottom of the guard on each side over the openings in the dial, so that the operator's fingers will not be injured if they are caught between the dial and the guard.

The driving pulley and cam and the large driving gears are all enclosed in substantially built angle iron and wire mesh guards which are so arranged that they can be opened when access to the belts and gears is necessary. This press is driven by an individual motor, with safety switch and guarded rheostat.

Fig. 5 shows a punch press equipped with a hand-operated guard which also acts as a tripping device. The foot-pedal of this machine has been removed and the guard directly connected to the clutch, so that the bringing down of the gate by the hand operates the press. This guard is adjusted so that the bottom of the gate must come down against the table and in front

of the ram before the press will operate. It is also necessary to raise the guard to its full height before the press will operate a second time.

The driving belt and pulleys are completely enclosed with angle iron and expanded metal guards, one side of this enclosure being arranged to form a door which can be removed to allow access to belt and clutch when necessary.

This picture also shows a safety electric switch and a rheostat with a home-made guard. The switch has no exposed "live" parts. When the current is on, the box is locked and it is necessary to pull the switch before the box can again be opened. When the box is open, the fuses are "dead."

The rheostat guard is made of sheet-iron and is provided with hinges so that it can be thrown back. The handle operates through a slot, which is so arranged that the guard cannot be thrown back when the power is on. This switch and rheostat operate the punch press shown in Fig. 3.

A pull-handle, for operating a tight and loose belt shifter and a home-made overhead belt guard are also shown in this picture. The belt shifter is so made that the belt is locked at either position and cannot creep from one pulley to the other.

Fig. 6 shows a press equipped with a stripper guard for blanking operations. The

opening in the side of the guard where the work passes through is too small to allow the fingers of the operator to enter. The belt and pulley are completely enclosed by an angle iron and wire mesh guard provided with hinged doors to allow easy access whenever such may be necessary. The protruding end of drive shaft and the oil cup are guarded with a sheet metal cap.

This picture also shows another type of overhead belt guard made from angle and metal strips.

In Fig. 7 is shown a press equipped with a Bliss non-repeating clutch, with guarded belt and pulley (guard shown partly open), and a type of safety electric switch, practically the same as that illustrated in Fig. 5. The rheostat is guarded by a metal and mica cover. With this type of

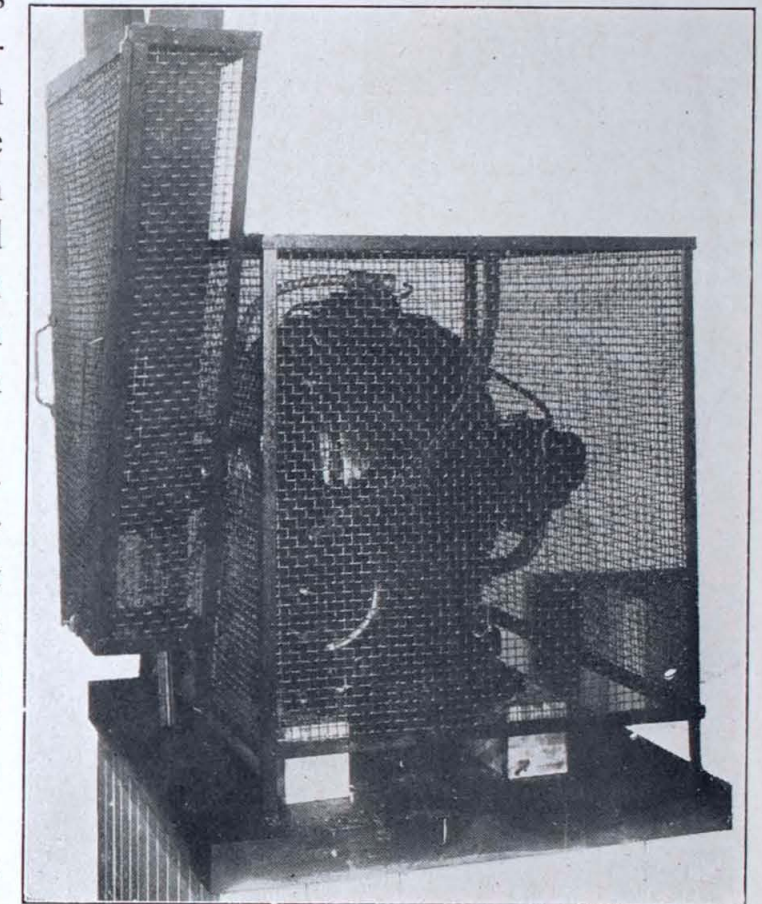


Fig. 2. Electric Motor Guarded.



rheostat guard, it is necessary to raise the cover in order to move the operating handle, but when the cover is down it acts as a preventive against anyone thoughtlessly touching live parts of the rheostat. This picture also shows a safety clutch, without protruding parts, and a sheet metal, angle iron and wire metal overhead belt and pulley guard.

Another important feature of this installation, also shown in Fig. 7,

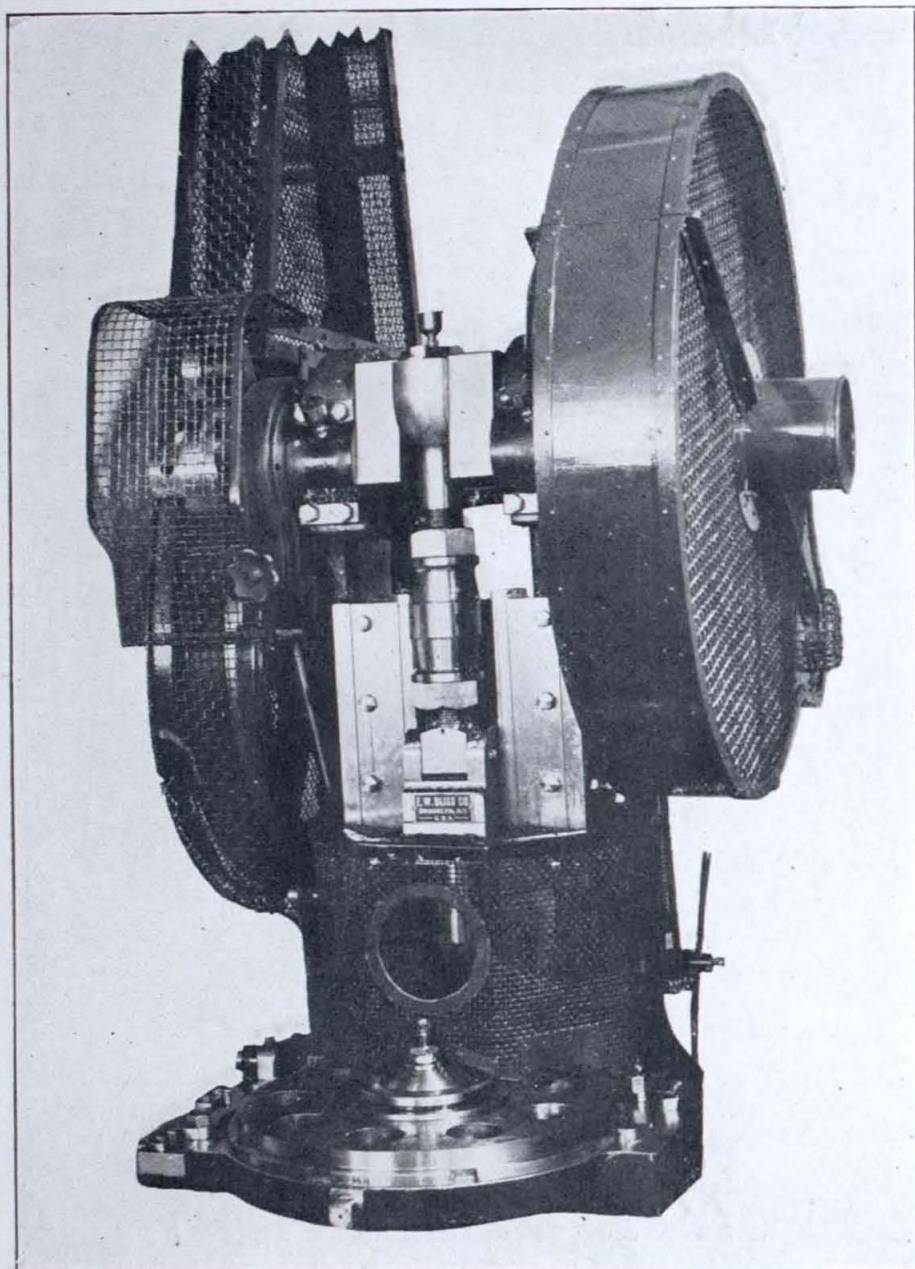


Fig. 3. Press with Guarded Dial Feed.

is an electrically operated instantaneous stopping device, known as a magnetic release. When the power is on, the weight marked "B" is held in position by a trigger, which can be instantly released by pushing any one of the electric push buttons located at convenient points on the frame (one shown at C). The pushing of any one of these buttons forms an electrical contact which releases the trigger, allowing the weight to fall, thus pulling out the clutch and stopping the machinery.

The clutch is shown in the out

position in this picture. When the clutch is in, flange "A" is raised to within about a foot of weight "B."

Fig. 8 shows a bench drill used for metal work, which is particularly well protected with a guard constructed of angle iron and wire mesh. Guards like these are so constructed that they can be opened for the purpose of oiling or repairing the machine, as shown in Fig. 9.

An angle iron and sheet metal guard for the overhead belt is also shown in this picture, as well as a pull rope for operating a tight and

When the power is on, the weight marked "B" is held in position by a trigger, which can be instantly released by pushing any one of the electric push buttons located at convenient points on the frame (one shown at C). The pushing of any one of these buttons forms an electrical contact which releases the trigger, allowing the weight to fall, thus pulling out the clutch and stopping the machinery.



Fig. 4. Another View of San Francisco Booth.



loose belt shifter. This belt shifter is so made that the belt is held at either position and cannot creep from one pulley to the other.

Fig. 9 also shows a protection for the commutator and brushes of an electric motor, which provides power for several of the smaller machines. The connections and cables are protected with a fibre guard. Although not shown in this picture, safety switches and guarded rheostat are used

in connection with this motor.

Fig. 10 shows a wood-boring machine, the driving belts and pulleys of which are protected by a guard constructed of iron pipe and expanded metal. The bit is protected by an adjustable guard.

Immediately over this machine is shown a dead end of shafting, well protected with a wire mesh guard. A sheet metal guard is also shown be-

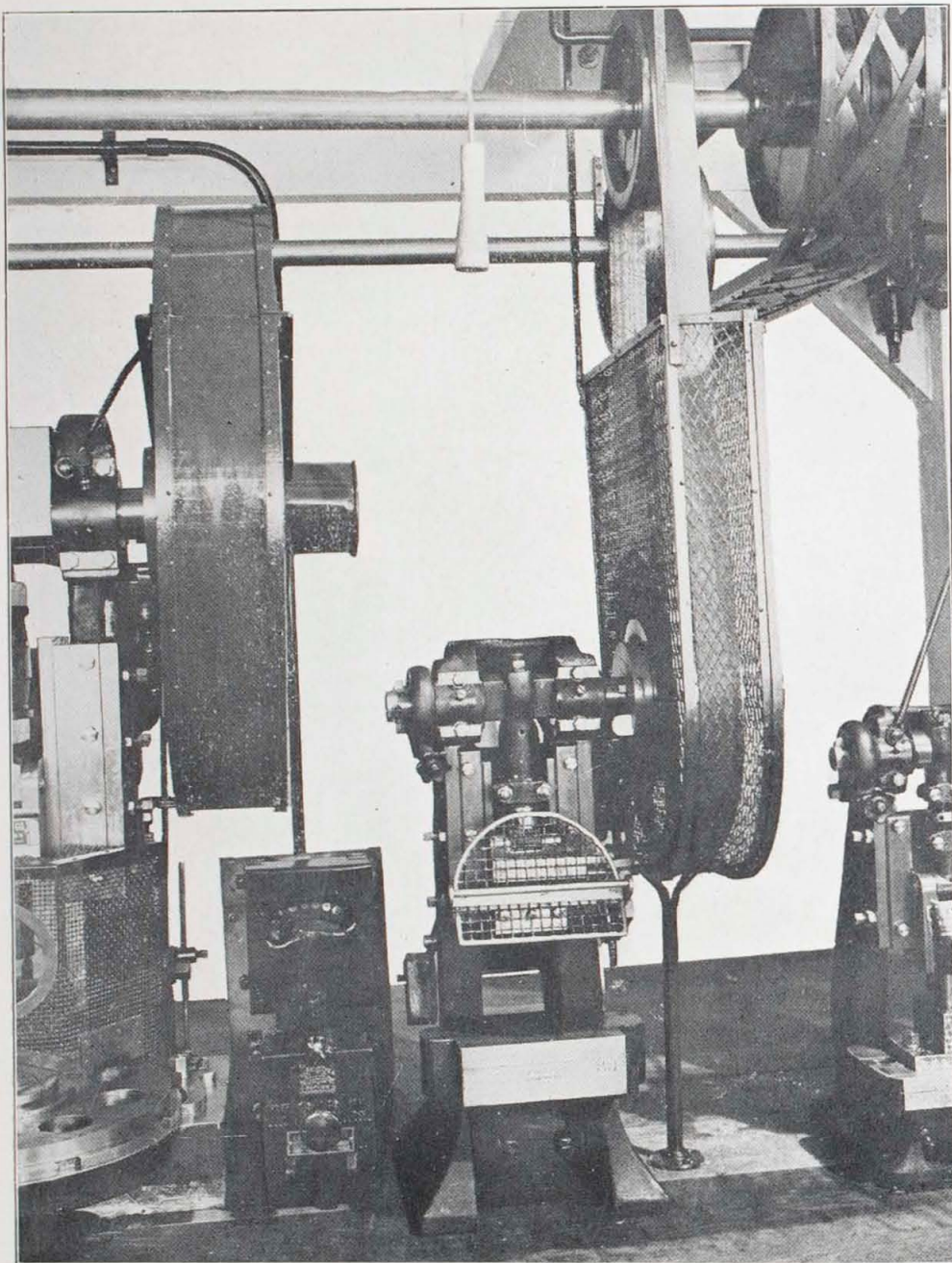


Fig. 5. Press with Hand-Operated Gate Guard.

tween the driving pulley and the hanger bracket, which serves as a protection when a workman is oiling the bearing.

Fig. 11 shows two lathes. The one in front is a modern lathe with all gears guarded by the manufacturer. A belt shifter for the overhead pulleys, furnished by the manufacturer, is also provided with this machine. The picture shows, too, a home-made belt shifter for the lower cone pulleys. A safety face plate is shown attached to this modern lathe.

The lathe in the rear is equipped with home-made guards, the guard over the change gears being partly open, permitting access to the gears. This machine is equipped with a safety dog and driver.

The guarding of cone belts has until recently been a difficult problem, because it was necessary to shift these belts by hand. In Fig. 12 two very effective cone belt shifters are shown. With either of these shifters the belts and pulleys can be completely guarded and the belt shifted rapidly by the simple turning or moving of the handles.

The installation of cone belt shifters not only is an advantage from an accident standpoint, but also means an increase in output for the machine. This is because the workman who has his machine set at low speed will not shift the belts for a short cut if it is necessary to do this by hand, but if belts can be rapidly

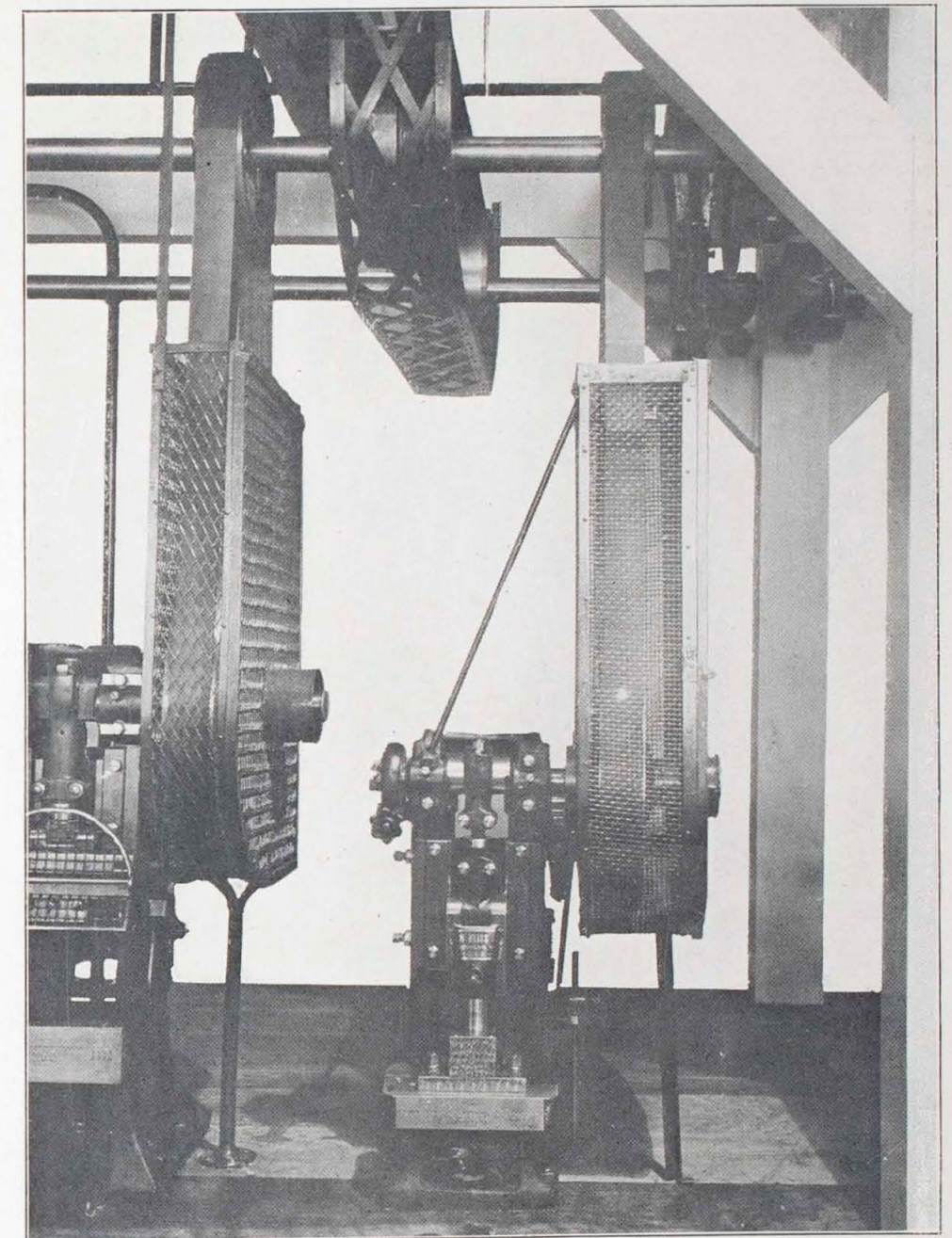


Fig. 6. Press with Stripper Guard.

shifted by a device similar to the ones shown in Fig. 12 he will change speeds according to the character of the work being done.

Simple but effective guards constructed of pipe and wire mesh are shown in front of the belts and cone pulleys.

This picture shows, too, a guard for the shifter above the frame and a home-made metal guard under the overhead driving belt.

The rear of a well-guarded grinding machine is also shown in the picture at the extreme right. The pulley is guarded by a cast iron en-



closure, which is part of the machine, and this has been extended to a height of six feet from the floor with angle iron and wire mesh. The wheels are enclosed in a cast steel and boiler plate adjustable hood, which, it has been proven, is strong enough to withstand the force of an explosion. The sides of the hood cover the nut and arbor end. Goggles are also provided for the use of the operator, and plate glass shields placed

above the exposed part of the wheel give additional protection to his eyes.

A notable feature of this entire installation is the showing in a compact space of such a large number of guarded and well-arranged mechanical appliances, including guarded main driving shafts and countershafts, self-oiling hangers, belt shifters, enclosed pulleys, belt hooks, etc.

The main driving shafts throughout are equipped with

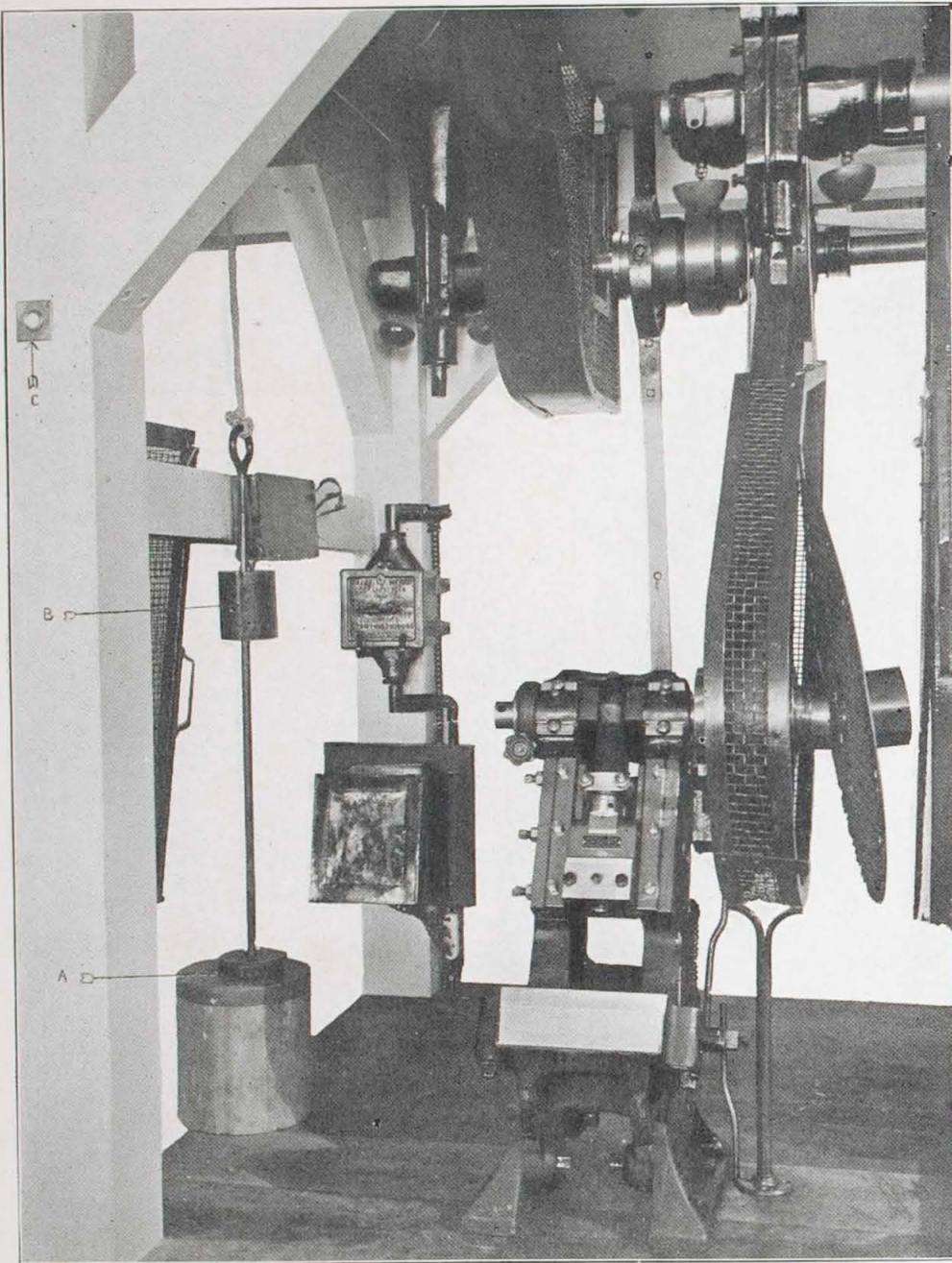


Fig. 7. Press with Non-Repeating Clutch.

safety couplings and clutches, and no protruding set screws or keys are used. Driving belts are placed, in so far as space would permit, at practical and safe working angles, and the necessary clearance is allowed between all pulleys and hanger brackets.

On top of the main platform is placed a length of shafting equipped with several old style dangerous couplings, the set screws and coupling bolts of which protrude in a dangerous manner. This length of shafting is not in operation, but is shown to illustrate the difference between safe and dangerous appliances.

## MINIATURE FACTORY MODEL.

Another especially interesting feature of the exhibit is a miniature factory model, several views of which are shown in Figs. 13 to 15. The purpose in building this factory was two-fold: First, to attract the attention of those persons not ordinarily interested in safeguarding; Second, to demonstrate in a practical manner the difference between a thoroughly guarded and up-to-date workshop and one where unguarded appliances and dangerous conditions exist.

This factory represents a mill-constructed building with brick walls. The entire fac-

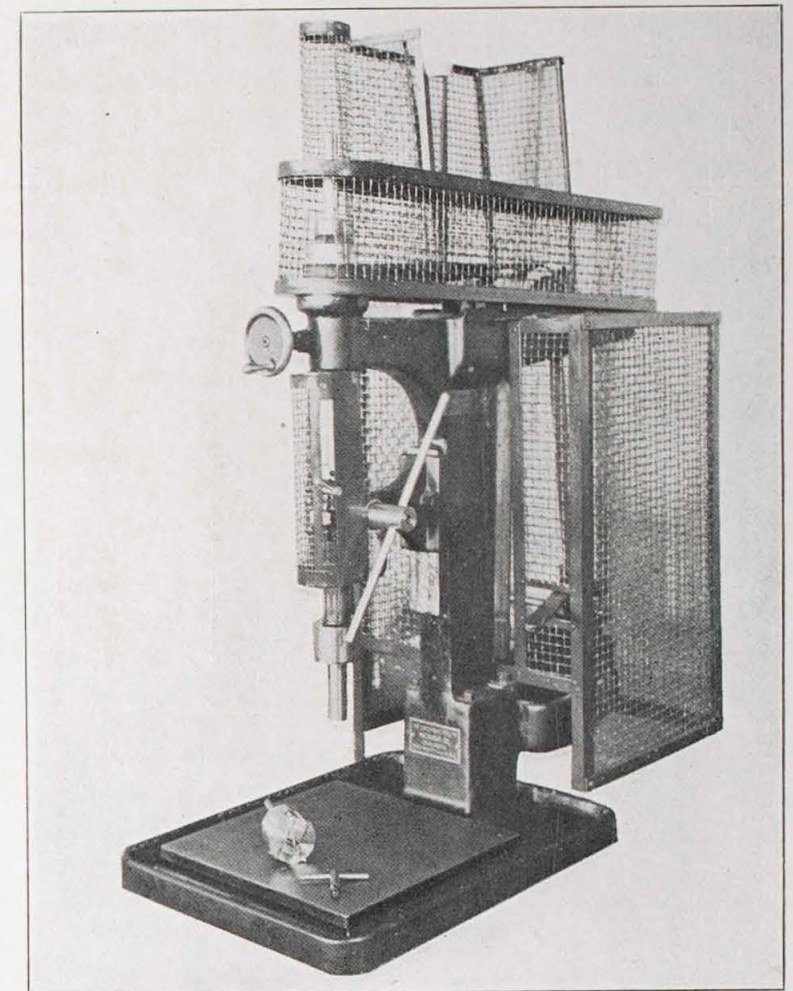


Fig. 8. Bench Drill Guarded.

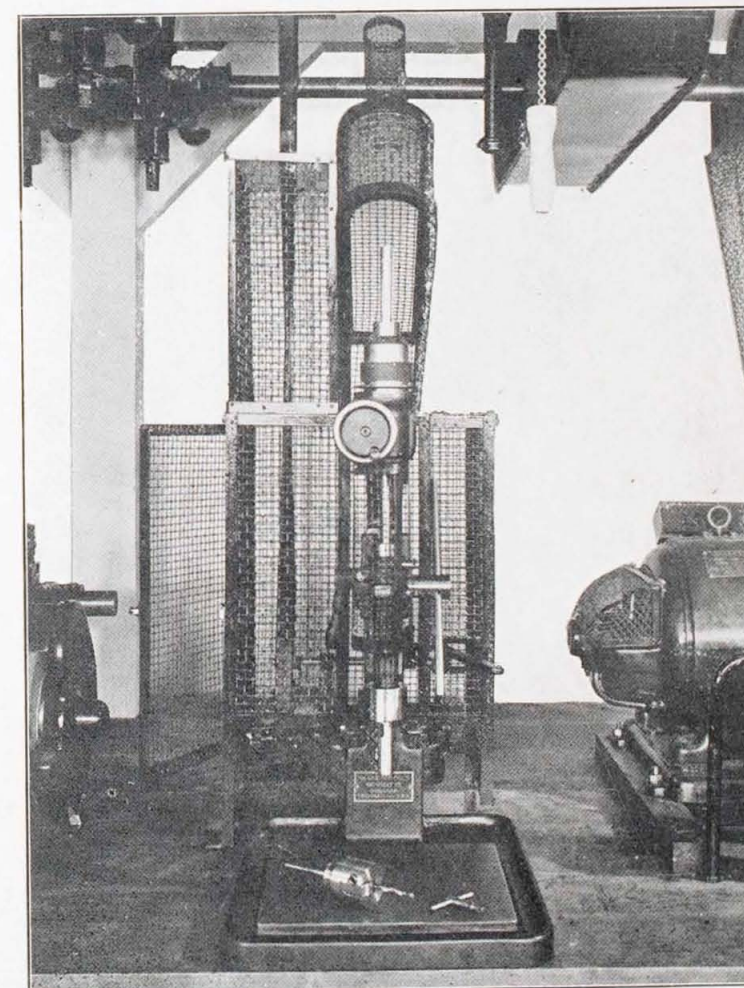


Fig. 9. Bench Drill Guards Open.

tory and contents are built to a scale of one inch to a foot. The building is four feet square, with outside brick elevator shaft and smoke-proof brick and concrete tower, having fire exits on one side. The floors represent 6-inch plank laid on 14-inch timbers, with 8-foot bays. It is divided into two equal parts by a fire-wall extending through the roof. The building is two stories in height, each floor being 15 inches high. This makes two factories, each two stories in height, with an area in each floor representing 24 x 48 feet. The idea of dividing the factory into two parts was to show on one side everything



up to standard as far as possible, while on the other no guards or safety appliances whatever would be shown. Otherwise, the two sides are practically the same, having similar machinery driven by individual motors on each floor.

Each factory represents a general jobbing shop, the upper floor being the woodworking department and the lower the metal-working department.

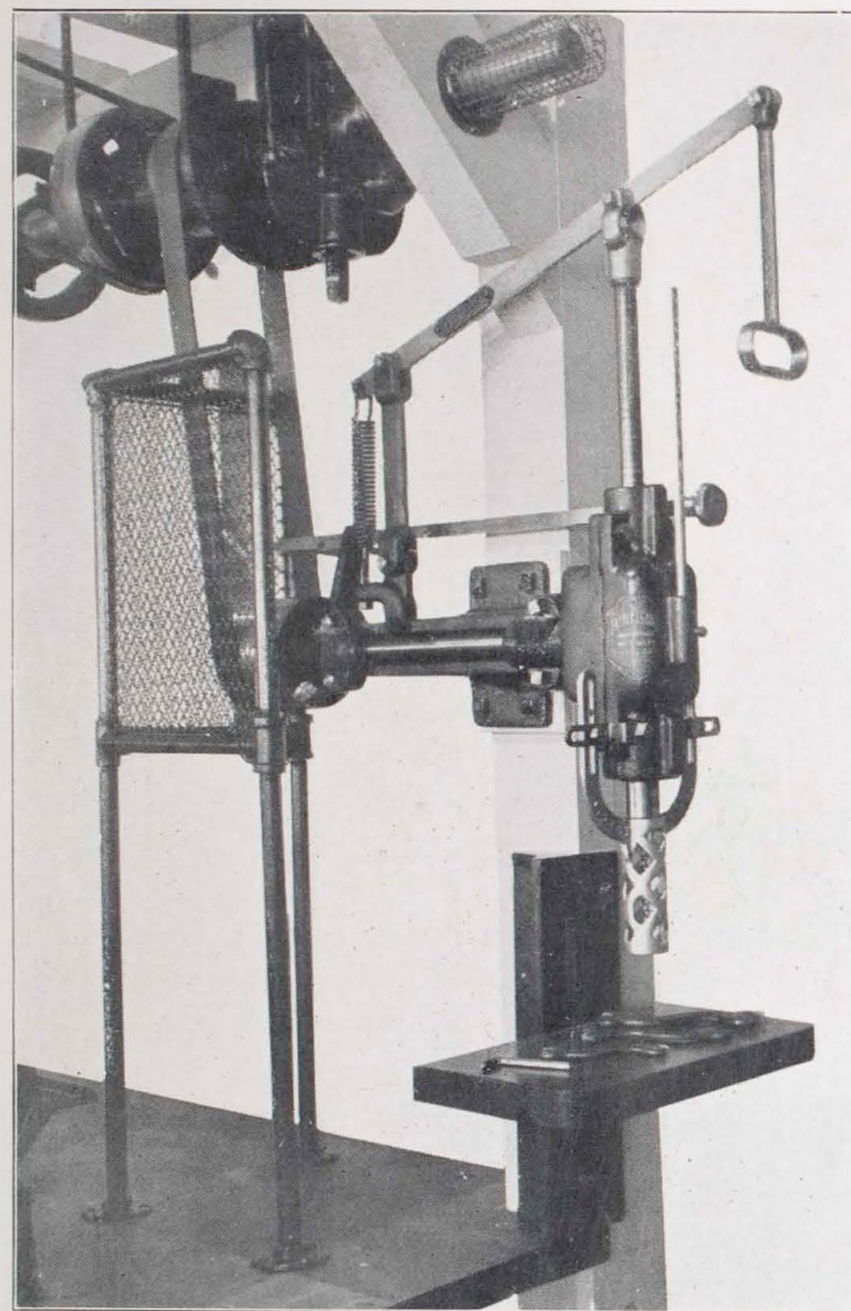


Fig. 10. Wood Boring Machine Guarded.

not provided with the necessary handrail or toeboards.

There is a floor opening in the middle of the second floor on each side. This hole on the guarded side is properly railed and toeboarded, while on the other side the hole is unprotected.

On the guarded side all the machines are properly protected with angle iron and wire mesh guards. The main overhead belts are guarded and the motors are enclosed with iron frames covered with wire mesh or with stand-

In the metal-working department the machines shown are: lathes, drill presses, hydraulic presses, drop hammers, punch presses, grinding and polishing wheels and milling machines. The second floor, or woodworking department, has band saws, circular saws, grinding wheel, wood lathe and jig saw.

On the guarded side the stairways are built at proper angles and have platforms half way down each flight, equipped with proper rails and toe-boards, while on the other, or unguarded, side the stairway is built at an acute angle extending upwards the entire length from the first to the second floor and is

ard rails and toeboards. All floor openings on this side are protected by tin-clad automatic fire-doors held open by fusible links.

A first-aid room fully equipped with first-aid cabinet, bed, chairs, etc., is partitioned off on the second floor of the good side. This side also has a neatly furnished office, including desk, chairs, desk lamp, clock, telephone, etc. It is equipped, too, with proper sanitary facilities and with miniature steam radiators.

Both sides are lighted with electric lamps, those on the poor side being small and badly arranged, giving only a minimum amount of light, while

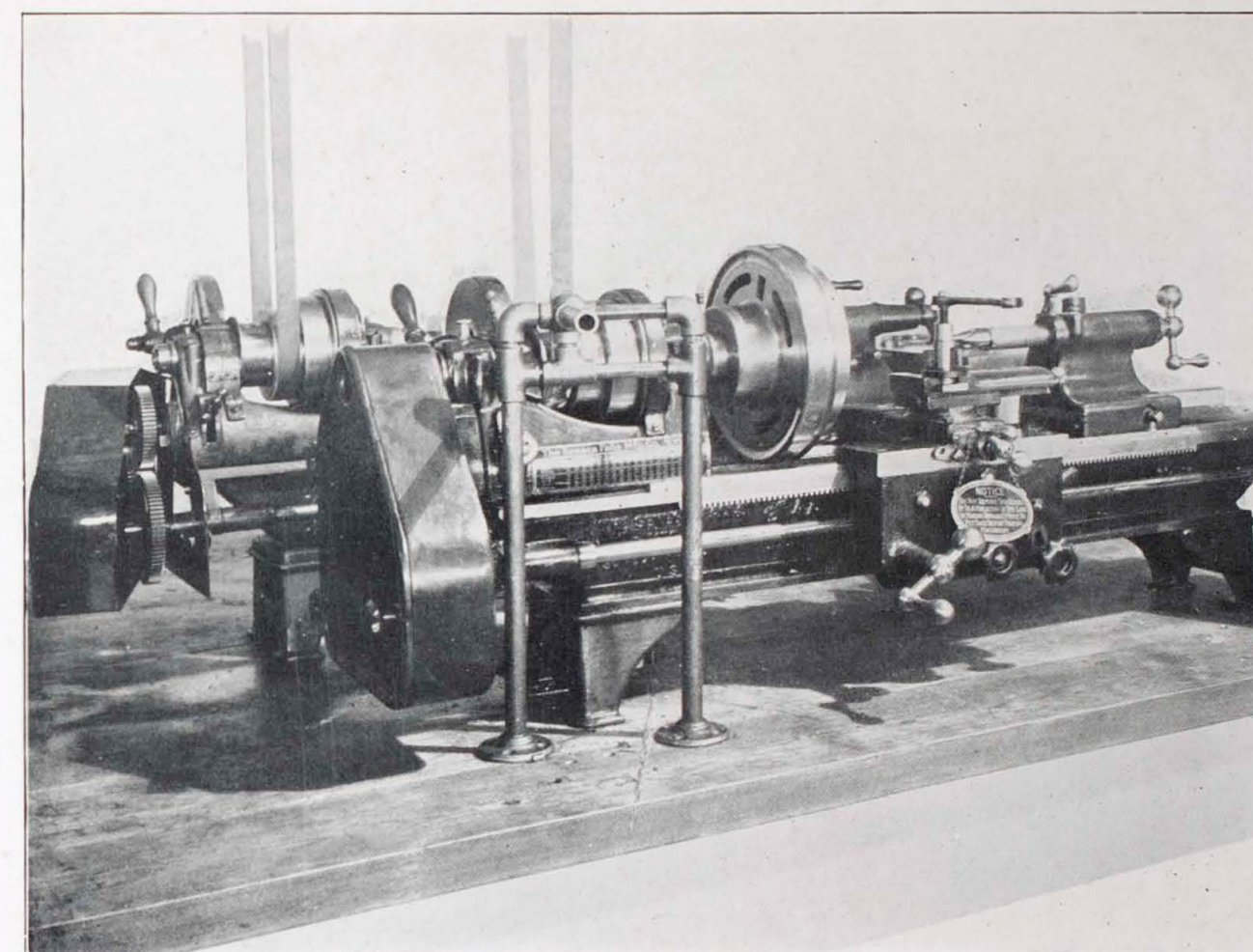


Fig. 11. Two Lathes Guarded.

those on the good side are large and well arranged, thoroughly lighting the building. On the good side the interior is painted with mill-white. The main electric wiring on both sides is in conduit with miniature snap button switches. The lighting for both sides is furnished from a storage battery arranged underneath the factory, with connections so that the battery can be charged from a 110 or 220 electric volt circuit. Rheostats are also installed so that the 110-volt motors can be run at any speed desired.

The windows of the factory are eighteen in number, containing in all 248 panes of glass, the frames of which are movable and arranged to open.

On the poor side there is no fire-escape, whereas on the good side there is a tin clad fire-door, provided with a green light, leading from the second



floor to an all-metal fire-escape. From this fire-escape another fire-door opens into a smoke-proof tower, which is clearly shown in Fig. 15. This picture also shows the elevator tower.

The elevator itself is built up to standard, being constructed of metal, while the top cover is provided with a hinged opening. The sides are covered with wire mesh up to standard height. This elevator is operated by a small handle on the counterweight.

The elevator tower is equipped with swinging tin-clad fire-doors and automatic closing gates, which are built to standard height, and extend

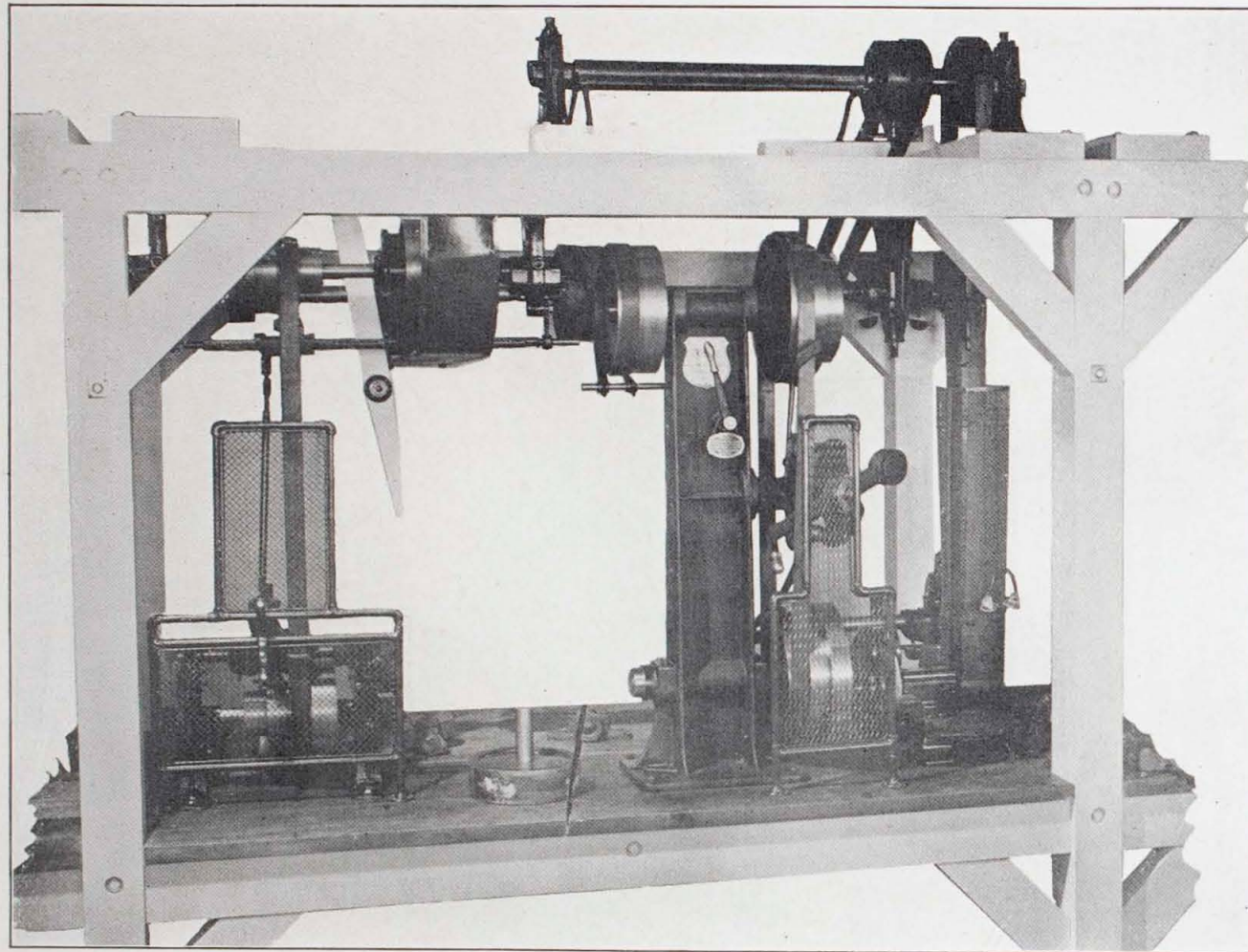


Fig. 12. Cone Belt Shifters and Various Guards.

all the way to the floor. Electric lights are also installed in the elevator and tower.

One of the principal features of this factory is the automatic sprinkler system installed on the good side. This sprinkler equipment was manufactured and installed at an expense of over \$1,000.00 by the General Fire Extinguisher Company of Providence, R. I. The equipment is perfect in every detail. The valves and heads and all the piping are of brass and constructed to the proper scale. The tank is also perfect in all details as to platforms, ladders, toeboards, etc.

The good side of the factory is equipped with a metal frame, wire-glass skylight. A wire-glass window is also installed above the fire-escape.

The roof is covered with coarse sand paper in imitation of a gravel roof. The outside walls of the building are ruled with white ink on a dark red ground, representing bricks of standard size. (See Fig. 13.)

The shafting throughout the factory consists of one-quarter inch round steel rods. The hangers are brass, adjustable both as to height and alignment. The pulleys are of safe armless type and the belting, except the main driving belts (which are of leather), are of coil spring steel.

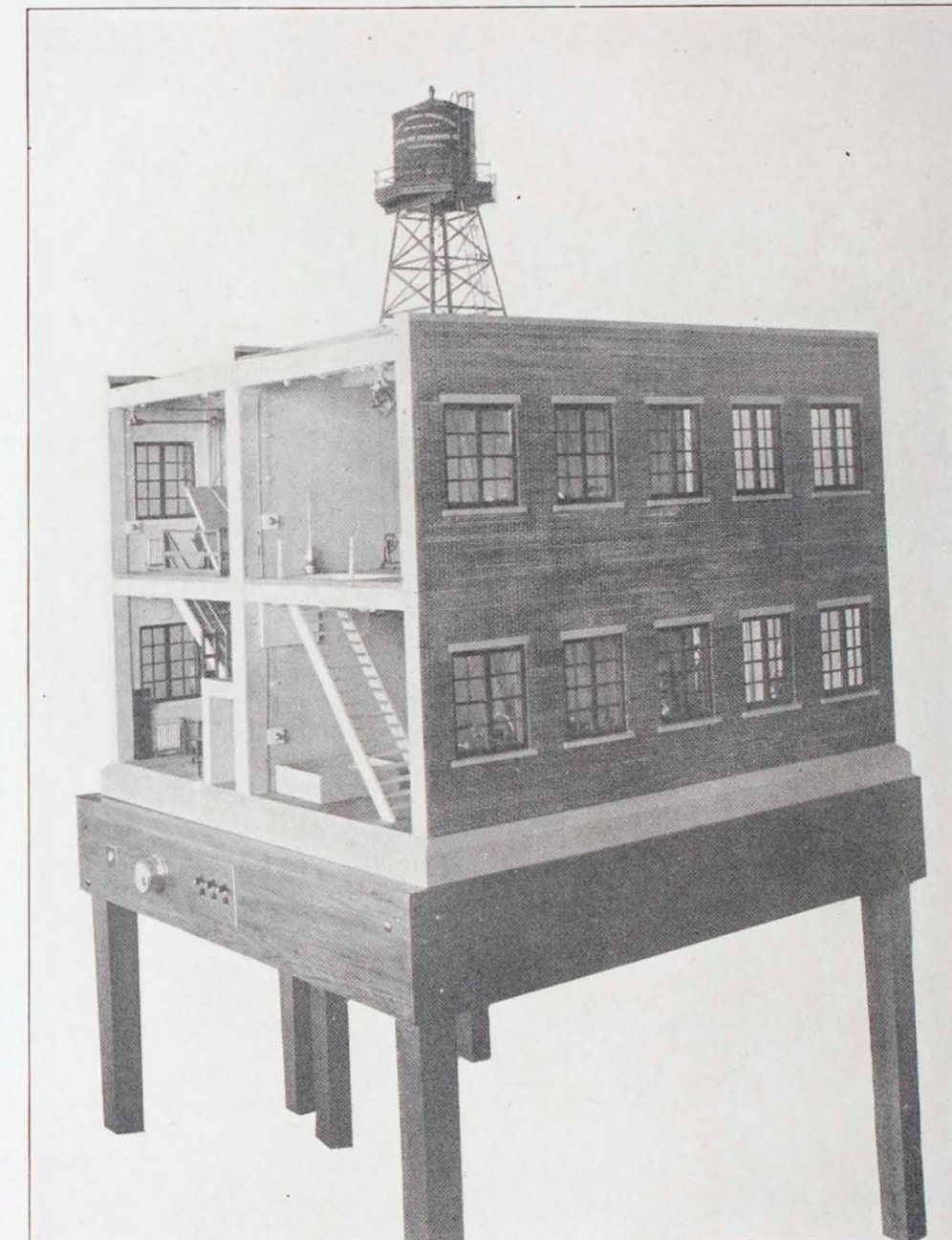


Fig. 13. Factory Model.

The hangers for the electric wires are made from fibre, painted white, and are an excellent imitation of the standard porcelain holders.

All safeguards attached to the small machines are made similar to those attached to large machines, with hinged openings to allow access to the belts, pulleys, etc. The grinding and polishing machines are equipped with exhaust systems.



All these small machines are imported models and perfect in every detail. They are exact miniature reproductions of the larger tools and have all the required adjustments.

#### SYNCHRONIZED STEREOMOTORGRAPH AND PHONOGRAPH.

Another notable feature of the exhibit is a stereomotorgraph, which automatically shows fifty-two lantern slides on a screen. In connection with this machine several specially made records were obtained for use on a phonograph, the phonograph being synchronized with the stereomotorgraph, so that when the pictures are shown on the screen they are described

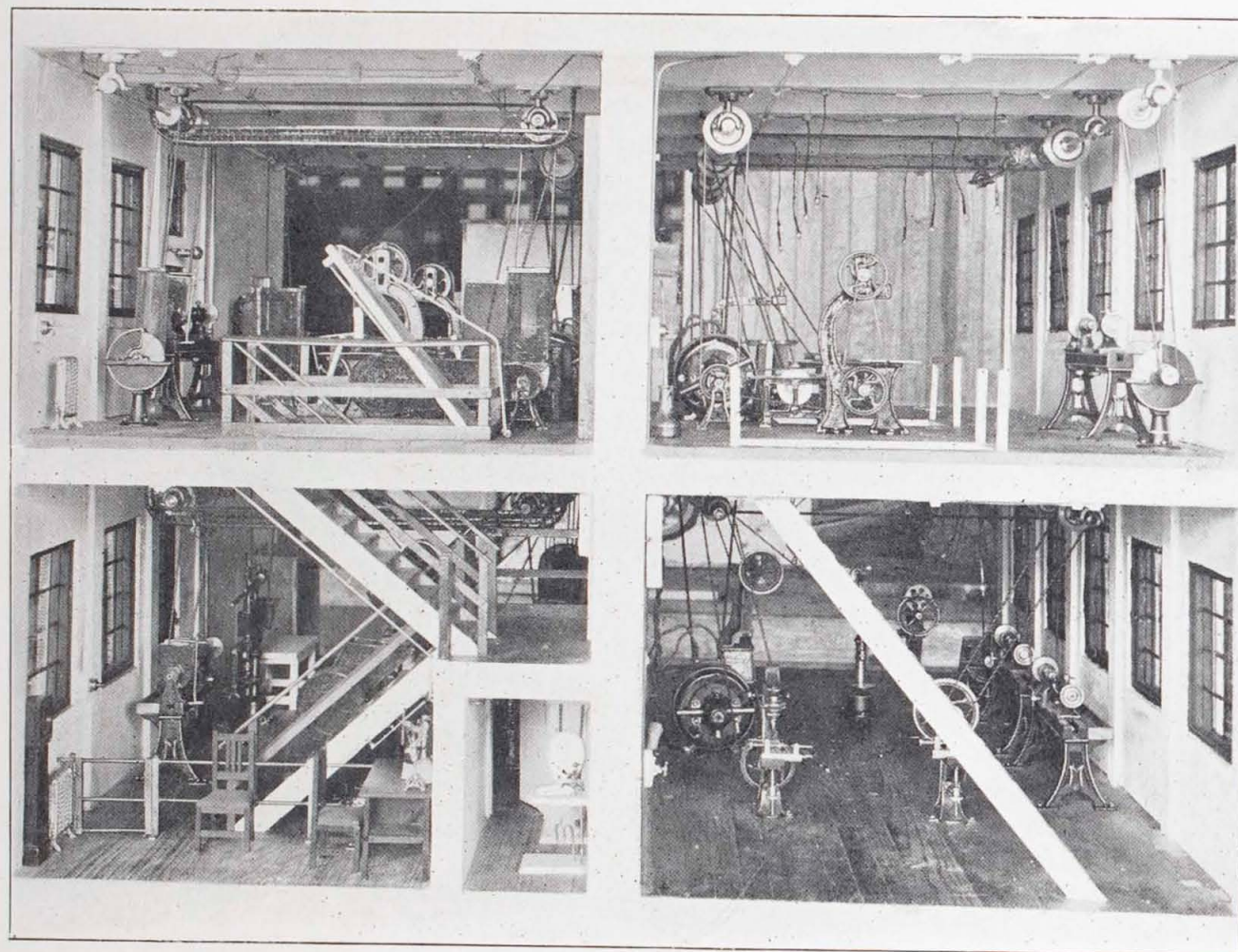


Fig. 14. Factory Model — Inside View.

by the phonograph. The pictures show different methods of safeguarding and also the results of accidents caused by the omission of safety devices.

#### COLLECTIONS OF PHOTOGRAPHS.

In addition to the above, there are two large frames containing over 1,000 hand-colored photographs showing many different types of home-made and other safeguards in use in factories throughout the country, and also safe methods of doing work as contrasted with unsafe ones. One of these frames is shown in Fig. 16.

These photographs are so arranged and classified that it is easy to locate any particular kind of guard in which the observer may be personally interested.

#### SAFEGUARD AND SAFETY APPLIANCE TABLES.

A large number of safeguards and safety appliances for different kinds of work are attractively displayed on eleven specially built tables.

On the table shown in Fig. 17 are displayed several samples of home-made safeguards to illustrate to manufacturers the different types of construction that can be used for making safeguards, varying from all open work to those of solid construction. There is also a complete sample gear guard which is provided with hinges and fastenings in such a manner that the top can easily be raised, giving ready access to the gears.

On one side of the table shown in Fig. 18 are two safety switches. Both switches are so arranged that all parts are enclosed, the boxes being locked when the power is on. When the power is off, the boxes can be opened and the fuses, which are then on the dead side of the line, can be handled with safety.

A sample of a lineman's protector shield is also shown. These shields are used by linemen when working on poles or other supports which carry live wires. If each of the live wires near the workmen is covered with one of these shields, the necessary work can be carried on with safety.

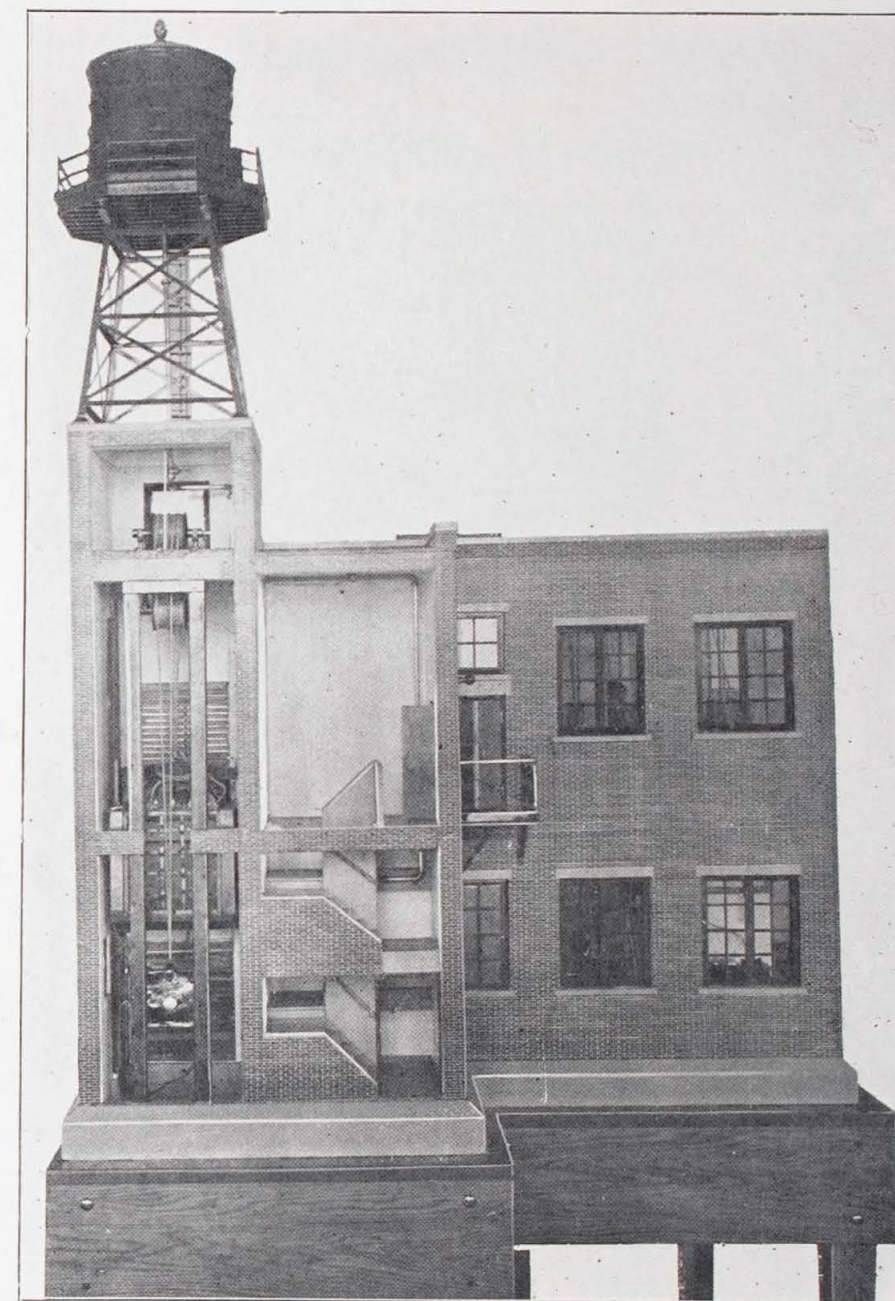


Fig. 15. Factory Model.



On this table is also shown a small frame displaying photographs of these shields in use and other electric articles and safety appliances.

On the other side of the table (shown in Fig. 19) are three other switches. The one in the center is built on the same principle as that described under Fig. 18. The smaller one to the right is an ordinary knife switch, enclosed in an iron box and operated by an insulated handle from the outside. Means are provided for locking this box, making it impossible to come into contact with any live parts.

The switch on the left is of the ordinary knife type, with locking

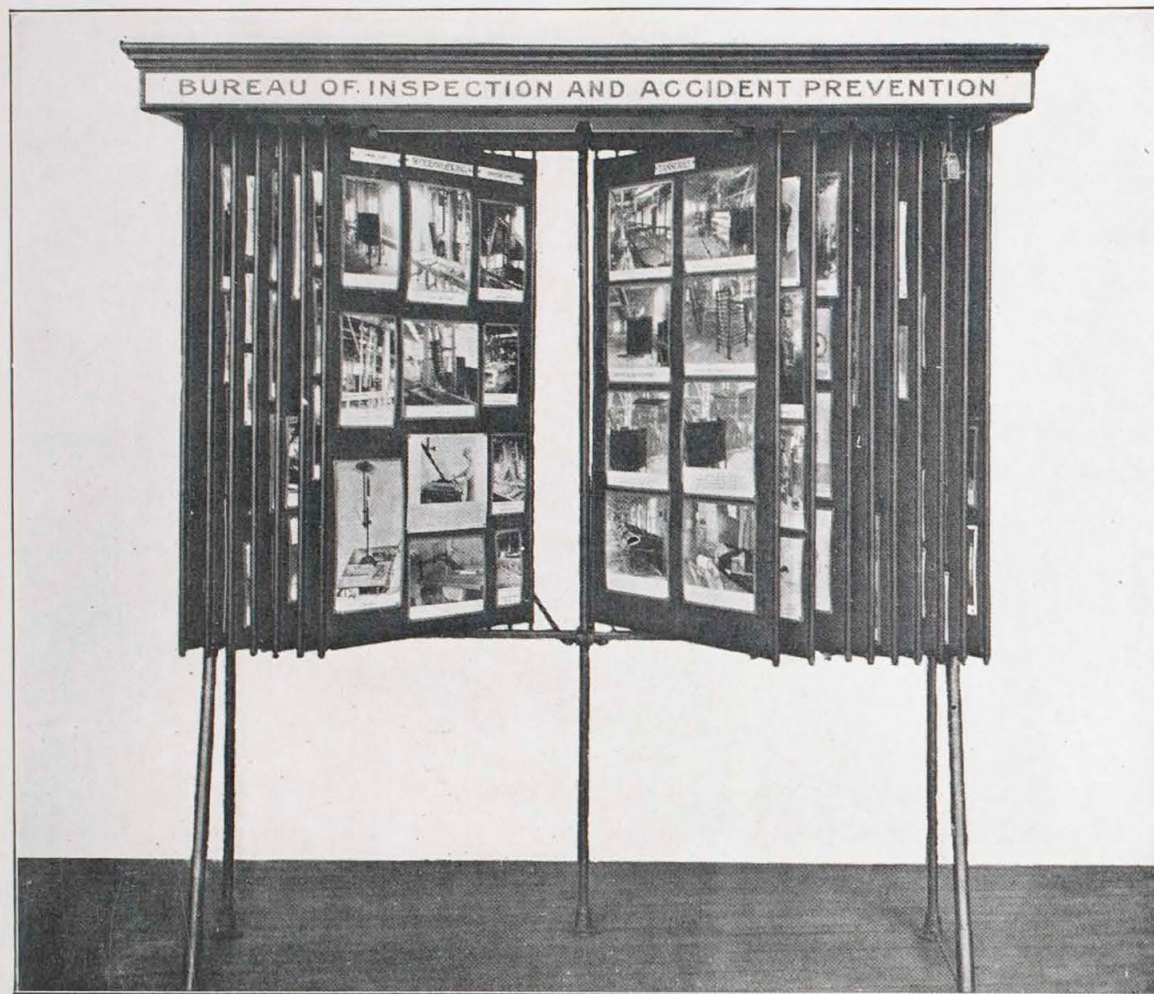


Fig. 16. One of the Collections of Photographs.

attachment. This lock is to enable a lineman to lock the switch open while he is working on a line.

Another table has mounted upon it a "baby jointer" with aluminum safeguard. Two jointer heads are also displayed to illustrate the difference between the old square type and the new circular head, called the "safety jointer head."

Upon another table are mounted two saw guards, also a jointer guard and a shaper guard.

The exhibit displayed on the table shown in Fig. 20 consists of several shaper guards, two of which are home-made guards. The home-made guard shown to the left is inexpensive and simple in construction, being composed entirely of wood. It is hinged in such a manner that when

adjustments are necessary, it can readily be swung back out of the way. A small photograph frame is also shown on this table, containing interesting pictures relative to this kind of work.

A very simple and effective home-made jointer guard is shown at the right in Fig. 21. This guard is of wood construction and can be easily manufactured in any workshop where jointers are in use. It affords excellent protection against injury. There is also shown an aluminum jointer guard. A small frame showing pictures of jointer guards in use is also displayed, by the side of which is a home-made hand pushing block to be used when carrying small pieces of work over the jointer.

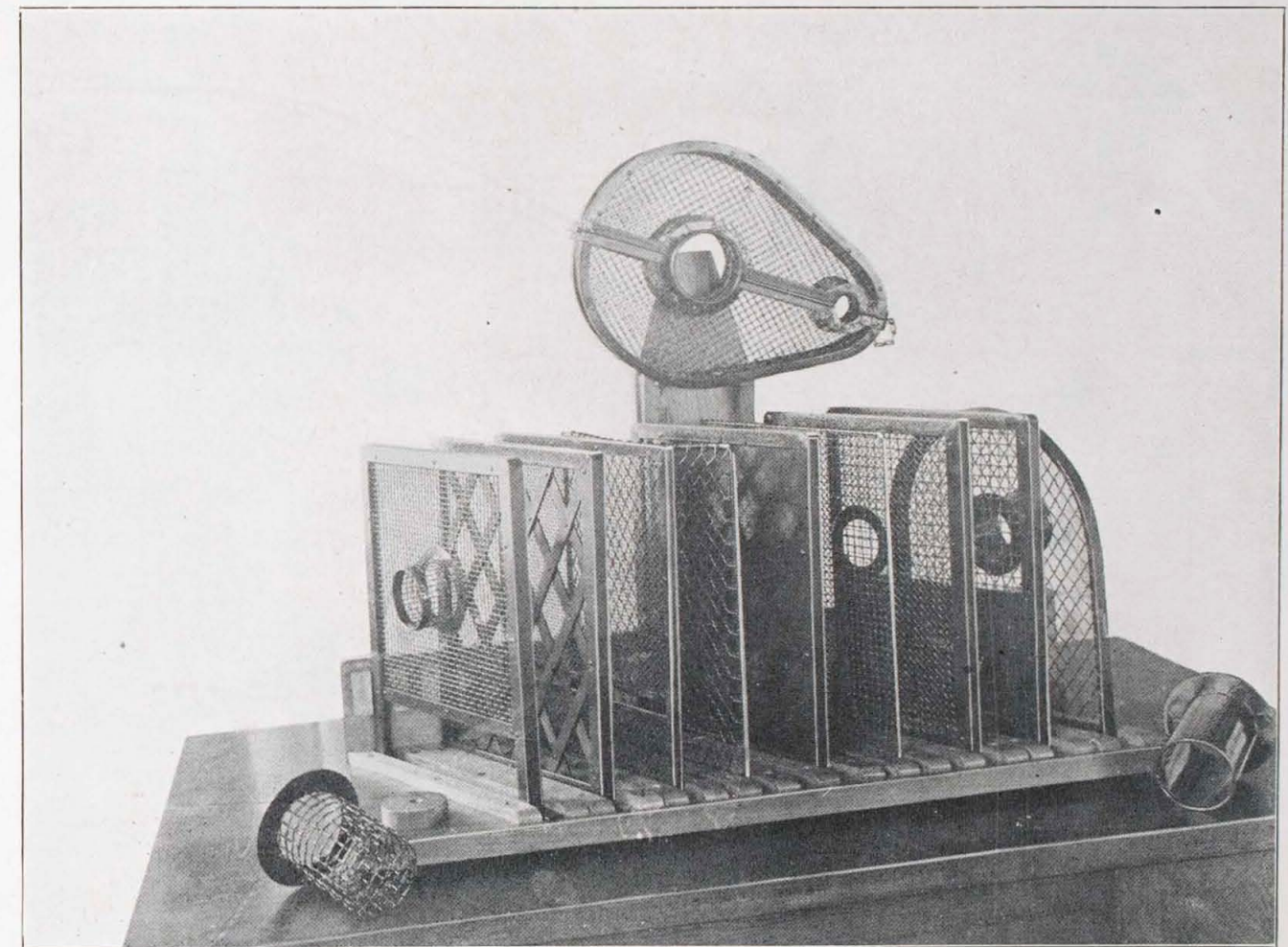


Fig. 17. Samples of Guard Construction.

On the table shown in Fig. 22 are mounted seven types of saw guards. The guards are placed over saws, illustrating exactly how they would be used in practice. A home-made saw guard is shown in the center. It is made of wood and can easily be manufactured in any woodworking shop. A special feature in connection with this guard is that in workshops where it is customary for a large percentage of the work to be of the same thickness, such as box-making, an electrical cut-out attachment can be arranged on a motor driven machine in such a way that the guard cannot be raised higher than necessary to allow the desired thickness of work to pass through, without shutting off the power and stopping the saw. This electrical device is shown at the back of the left upright and is properly guarded with



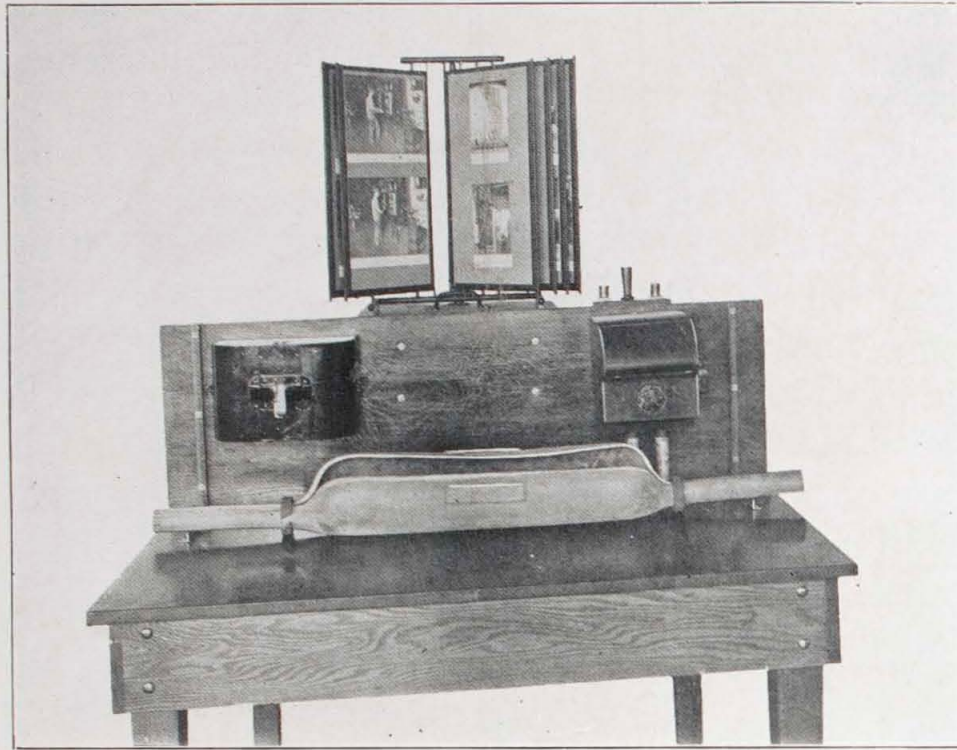


Fig. 18. Electrical Safety Devices.

a strong wire mesh case, having a locked door to prevent anyone being injured or interfering with its adjustments.

The tables shown in Figs. 23 and 24 contain a varied collection of safety devices and appliances, including safety collars, safety set screws, safety stair treads, safety shoes for ladders, a miniature automobile equipped with chemical fire extinguisher, never-slip clamps for handling heavy plates, sand blast helmet, safe and easily removable shoes for moulders, several types of respirators for use by employees handling acids which emit dangerous fumes, or when working in dusty places, and a large assortment of goggles for different uses, such as protection against chipping, grinding dust, electric welding, etc.

Another table shows a factory type of sewing machine, power-driven, the driving shafts and belt of which are well guarded with sheet iron panels. These panels effectually prevent the clothing of the operator becoming entangled in the revolving parts of the machine, and are hinged to permit access to belts, etc., when necessary.

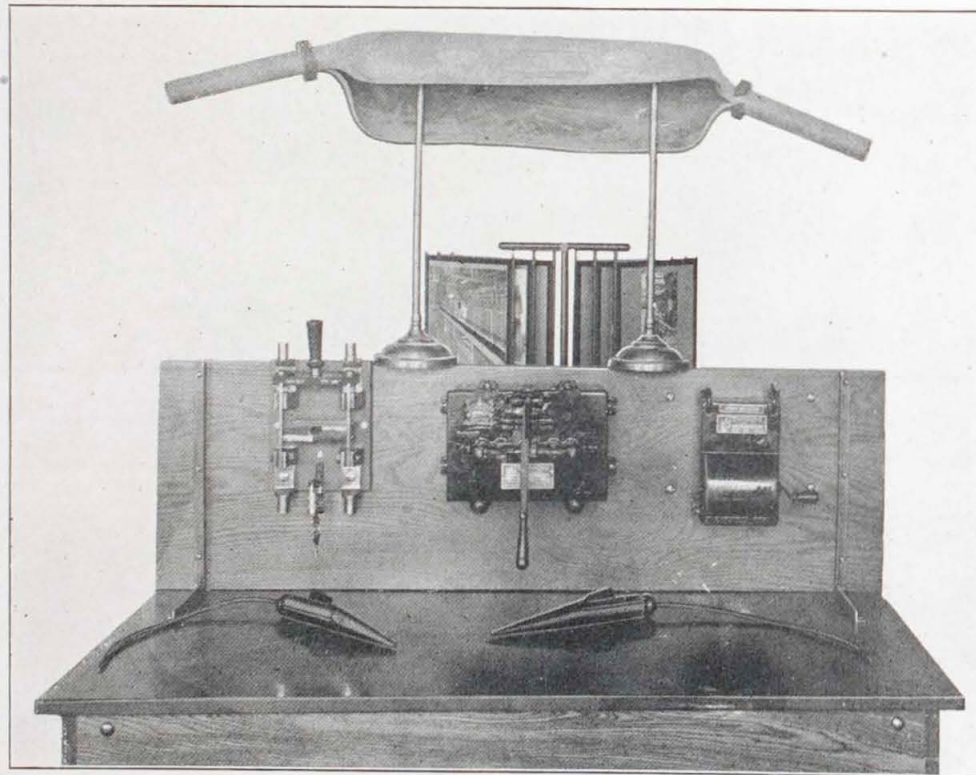


Fig. 19. Electrical Safety Devices.

## ORGANIZATION AND EDUCATION IN SAFETY WORK.

The importance of organization and education to successful accident prevention work is so great that these subjects deserve much more promi-

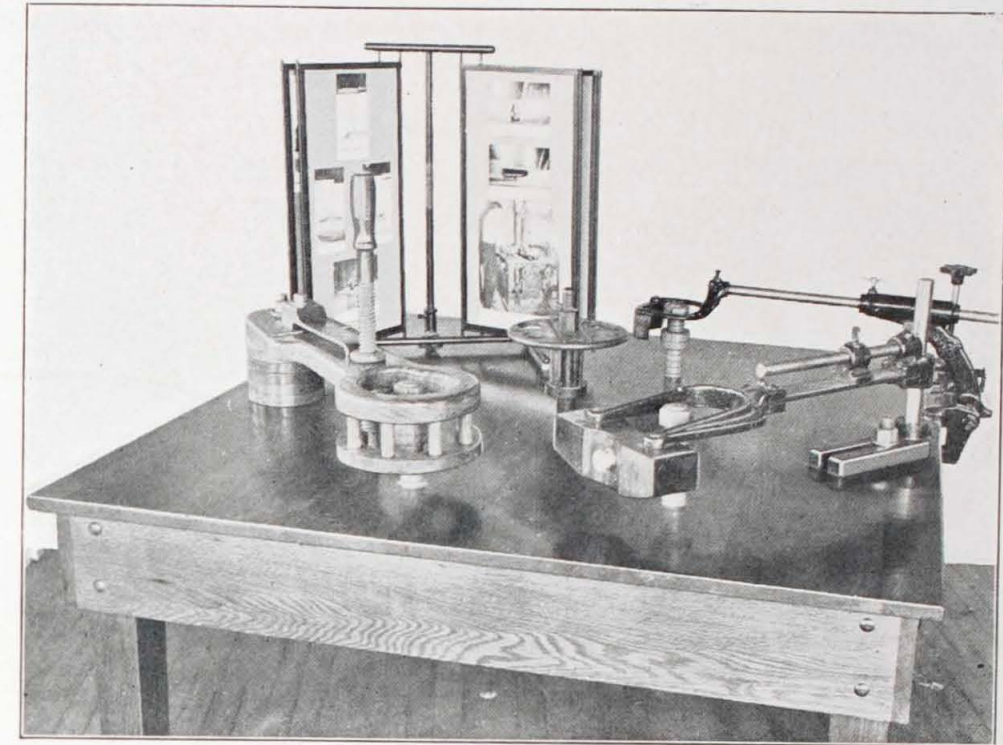


Fig. 20. Wood Shaper Guards.

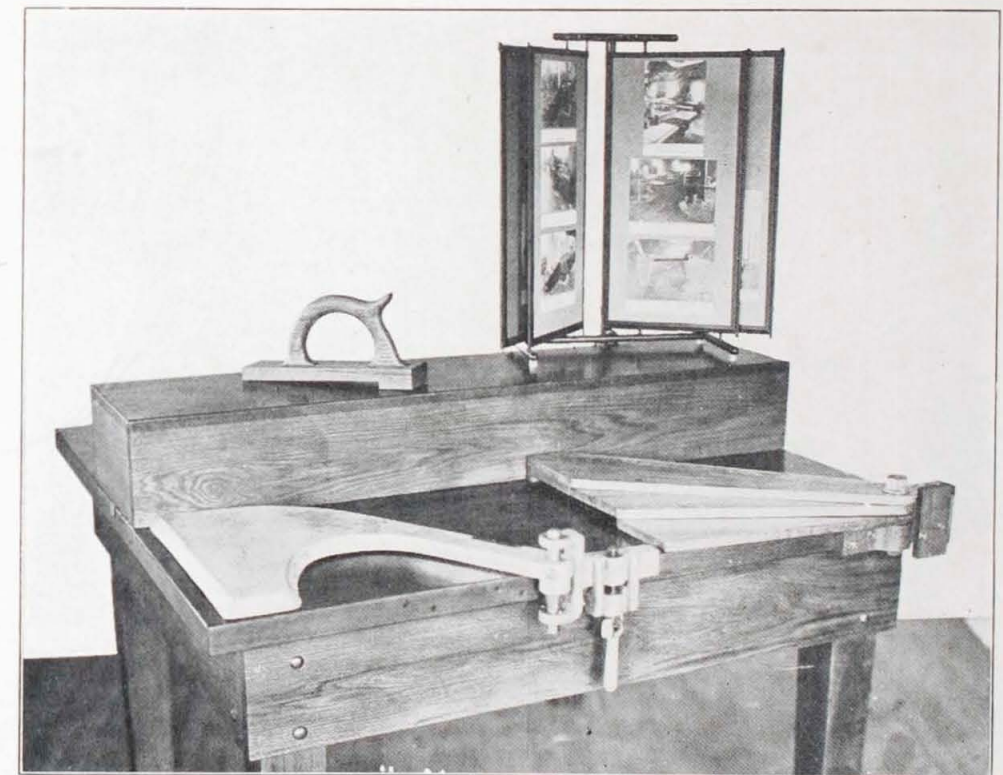


Fig. 21. Wood Jointer Safety Devices.

nence than can well be given them in exhibits of accident prevention methods. Organization and education are too intangible to figure so noticeably in an exhibit as naturally is easily possible for such illustrations of safety work as a platform filled with moving machinery or a large and



varied collection of actual safety devices. Suitable illustration of organization and education can be found only in the plants where these are actually carried on.

Included in the exhibit are about all that can be shown in any exhibit, namely, charts outlining plans for organizing safety work in plants of different sizes and figures illustrating what large reductions in accidents have been made in plants where systematic safety work has been undertaken and faithfully carried on. It is impossible to state with any reasonable degree of accuracy the relative importance of organization and education as compared with physical safety devices, but it is certainly safe to assume that many preventable accidents can be prevented only by

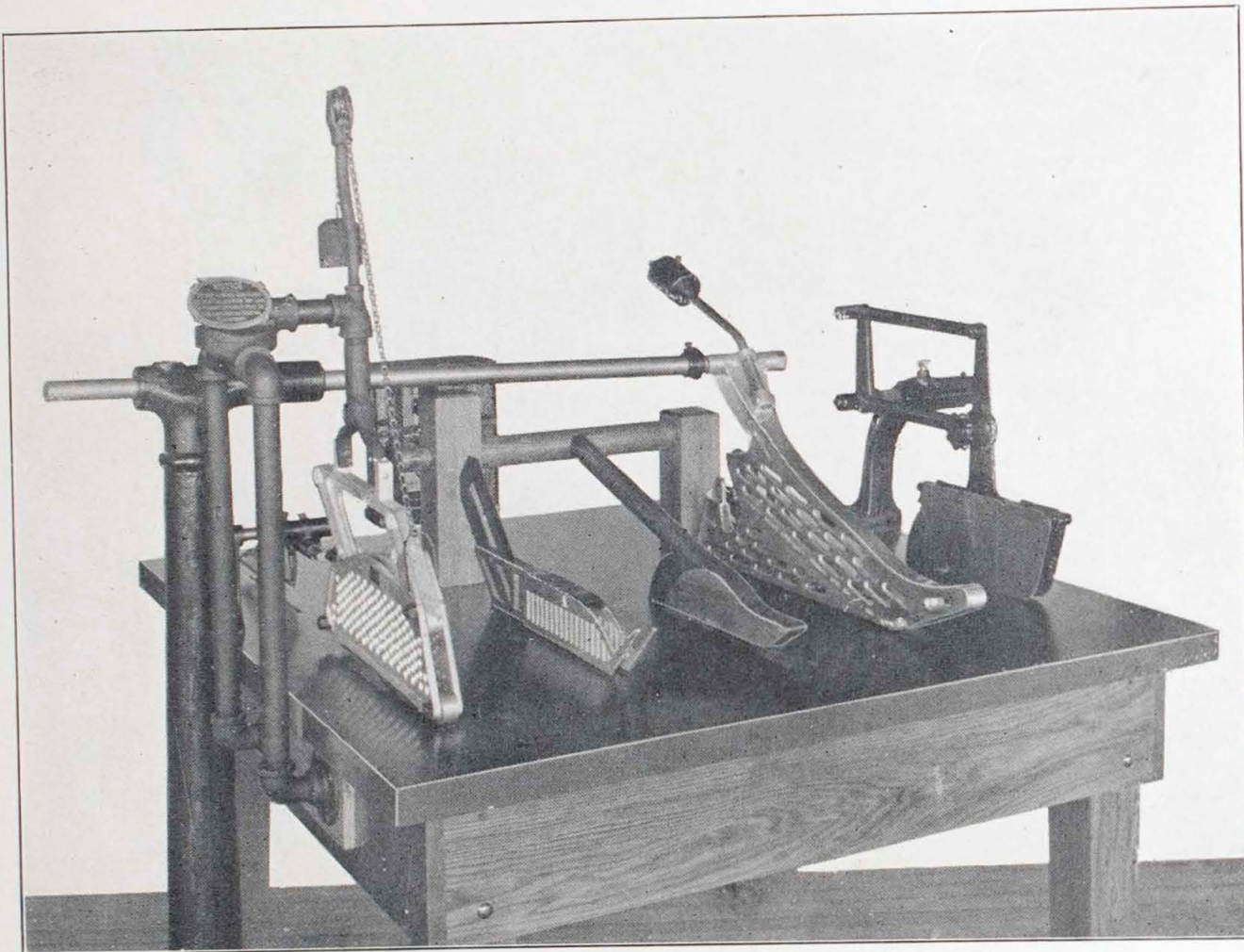


Fig. 22. Circular Saw Guards.

organization and educational work. In the exhibit will be found charts suggesting plans of organization for plants of the following sizes:

Less than fifty employees, fifty to one hundred and fifty employees, one hundred and fifty to five hundred employees, five hundred to one thousand employees and over one thousand employees. It is believed that these charts include the general suggestions which are best adaptable to plants of these sizes. Two of them are shown in Figs. 25 and 26.

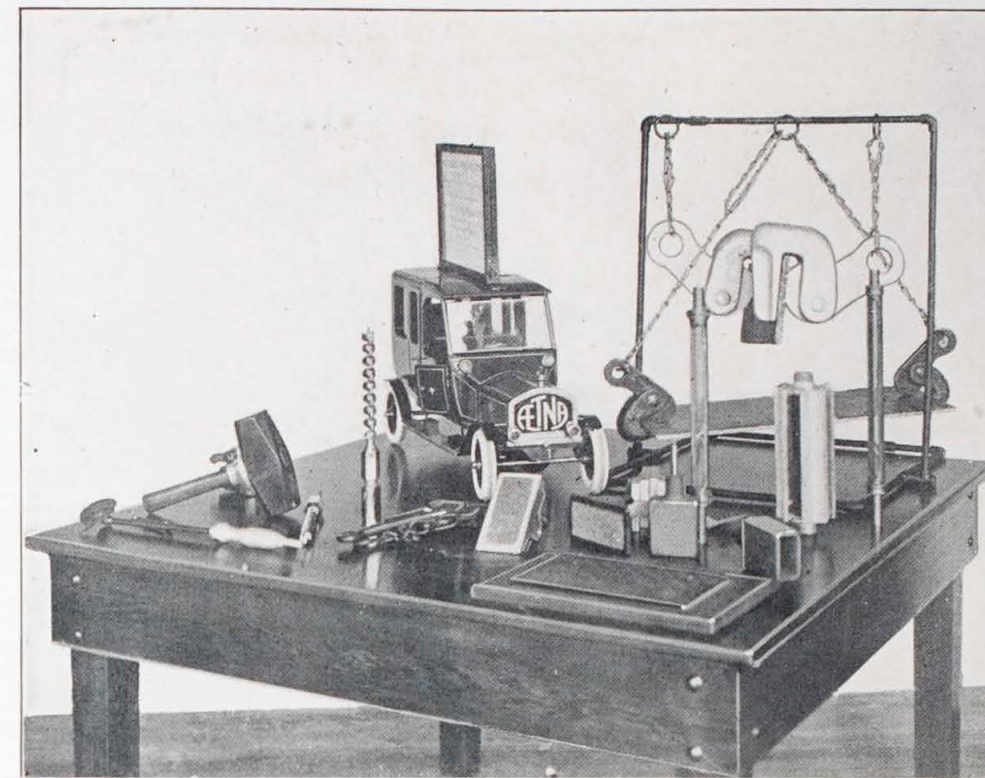


Fig. 23. Collection of Safety Devices.

assigning some competent man to make regular weekly inspections and to submit written reports.

While committees are generally desirable for planning and handling safety work, such committees do not seem practicable in plants of less than 50 employees. In such a plant the superintendent or manager can best do the work which would ordinarily be done by a committee,

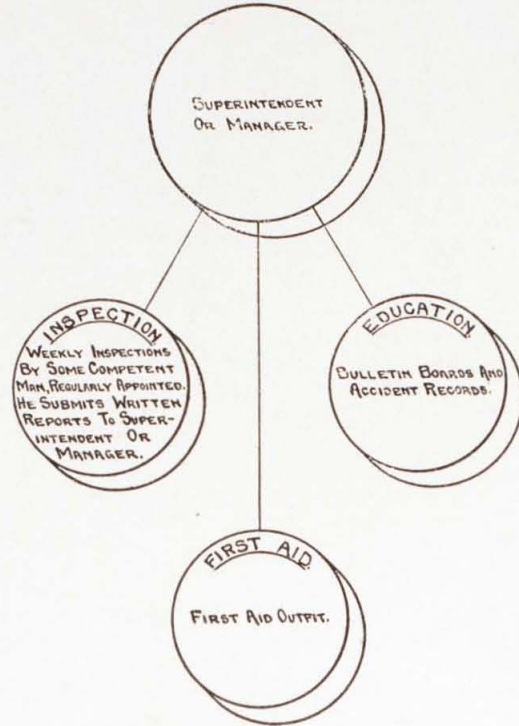


Fig. 24. Collection of Safety Devices.



## ORGANIZATION FOR SAFETY WORK

### SUGGESTED PLAN FOR PLANTS WITH LESS THAN 50 EMPLOYEES



### SUGGESTED PLAN FOR PLANTS WITH FROM 50 TO 150 EMPLOYEES

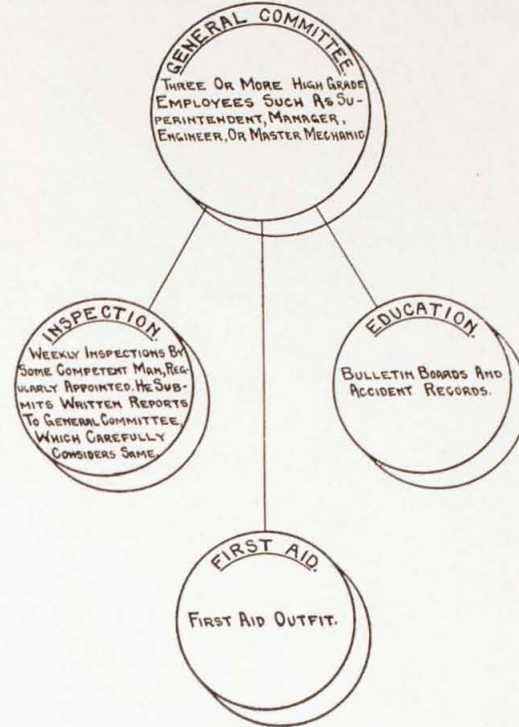
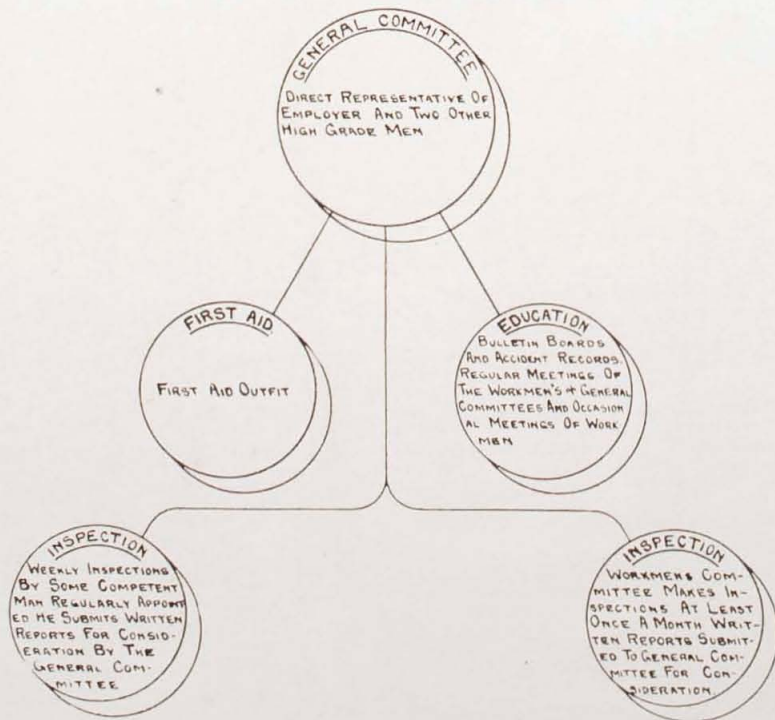


Fig. 25. Organization Chart.

## ORGANIZATION FOR SAFETY WORK

### SUGGESTED PLAN FOR PLANTS WITH FROM 150 TO 500 EMPLOYEES



### SUGGESTED PLAN FOR PLANTS WITH FROM 500 TO 1000 EMPLOYEES

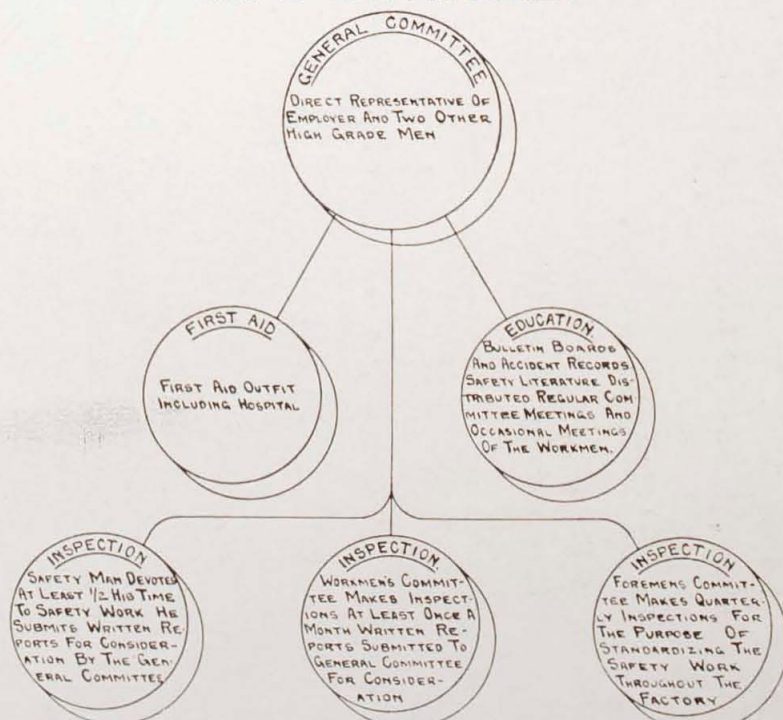


Fig. 26. Organization Chart.



In a plant employing from 50 to 150 men there should be a general safety committee composed of three or more high grade employees, in charge of all accident prevention and first aid work. The same system of weekly inspections and reports by a competent man should be followed.

In plants of the above sizes the only practicable suggestions for educational work seem to be the use of the bulletin boards and the making of accident records.

For plants employing more than 150 employees, not only is a wider range of educational work possible, but committees of workmen, or both workmen's and foremen's committees, can share in the inspection work.

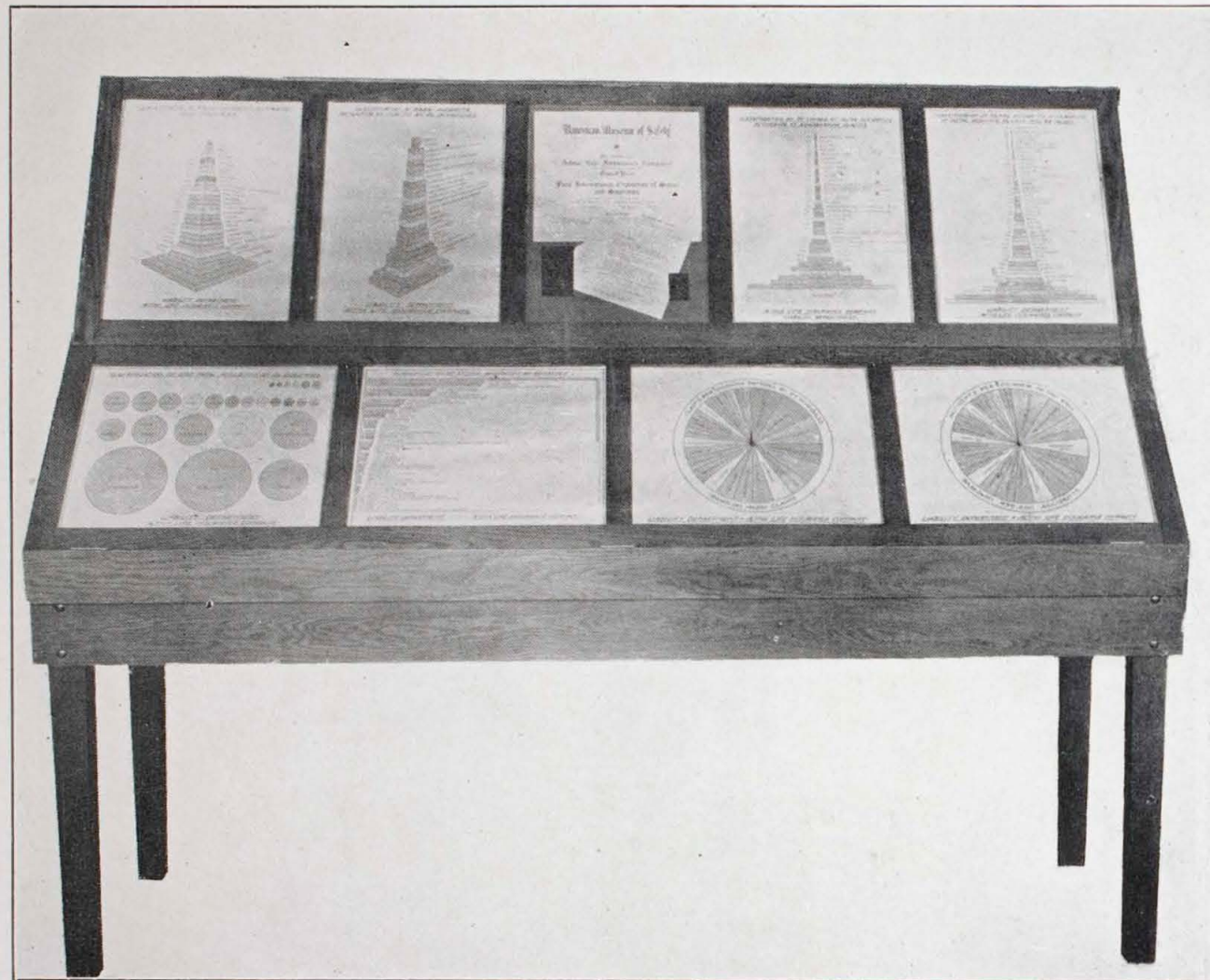


Fig. 27. Table of Charts.

#### ACCIDENT STATISTICS CHARTS.

Among the most interesting features of the exhibit are two specially built tables similar to the one shown in Fig. 27, containing these safety organization charts and a number of hand-drawn colored charts designed to illustrate and classify the causes and frequency of accidents in the different trades. Several of these charts are reproduced in Figs. 28, 29, 30, 31 and 32 and are self-explanatory.

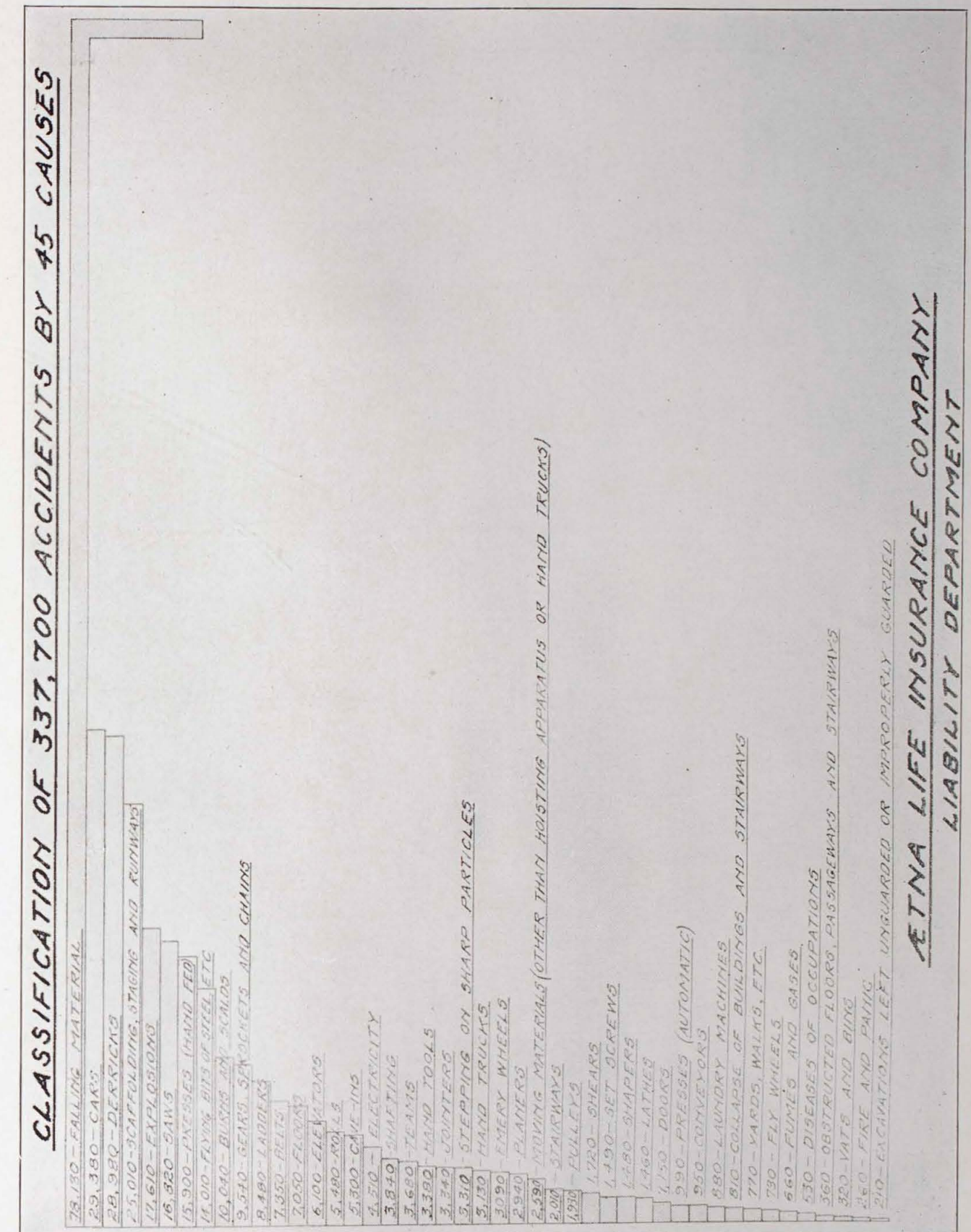
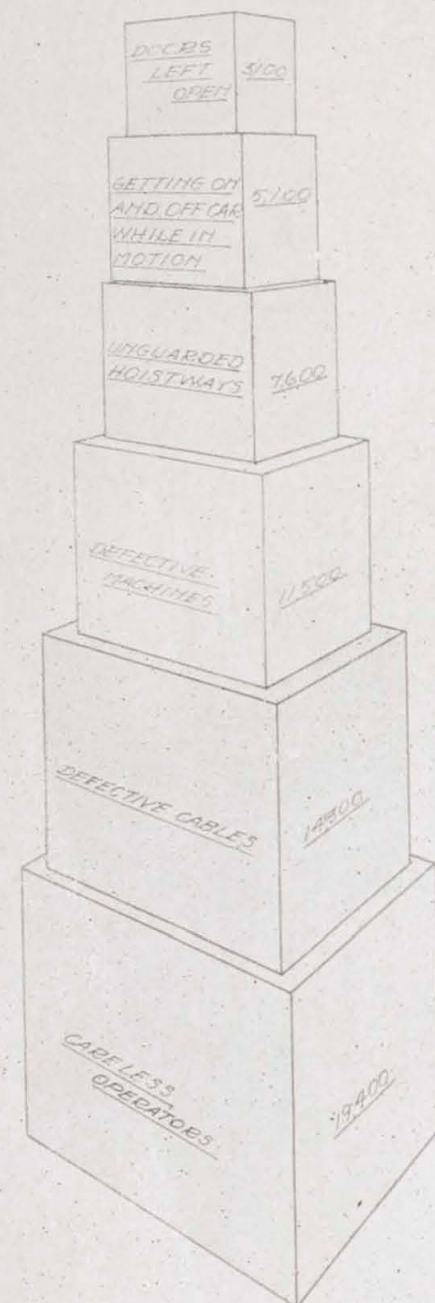


Fig. 28. Accident Statistics Chart.



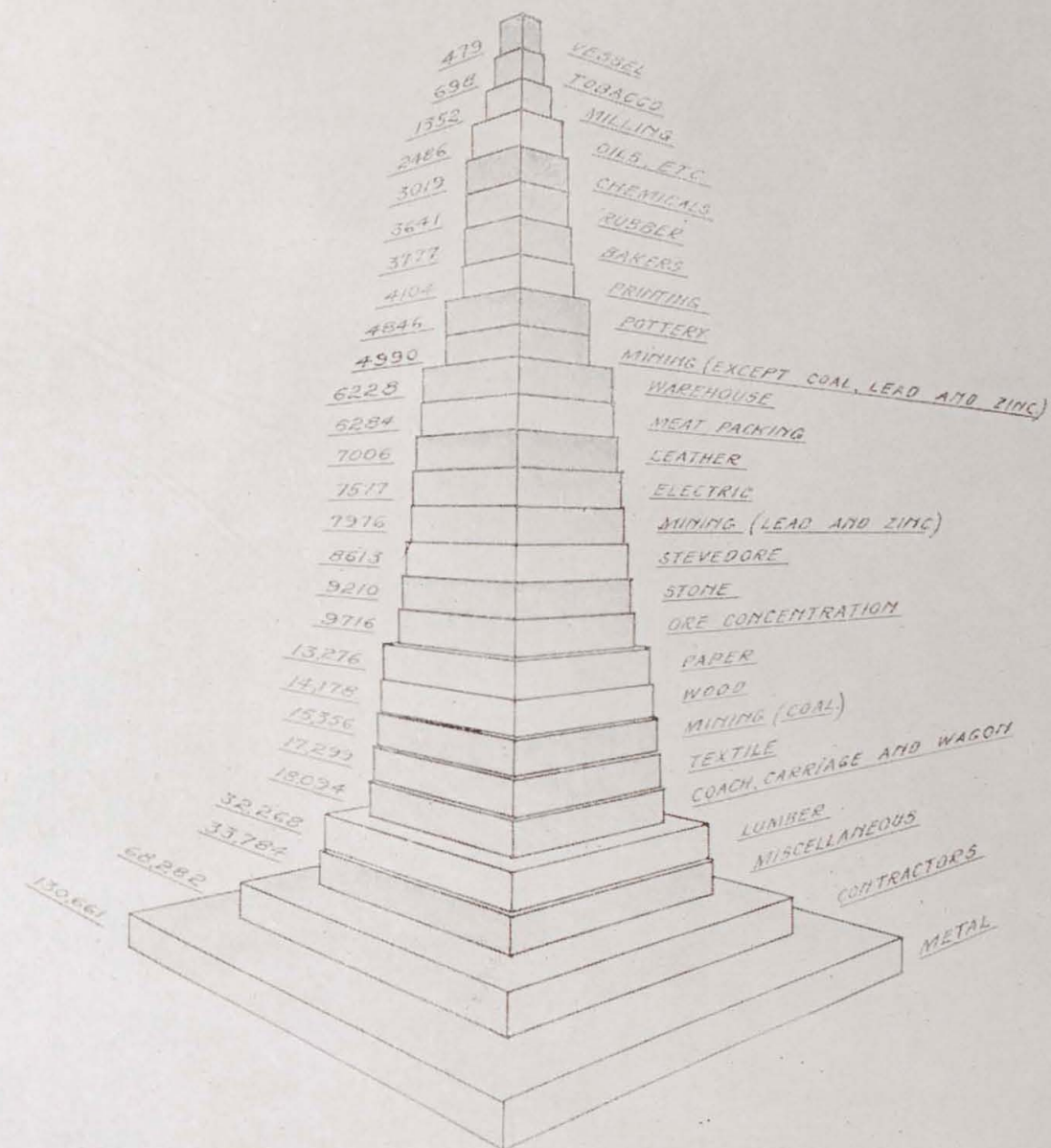
CLASSIFICATION OF 6,000 ELEVATOR ACCIDENTS BY  
SIX PRINCIPAL CAUSES



LIABILITY DEPARTMENT  
AETNA LIFE INSURANCE COMPANY

Fig. 29. Accident Statistics Chart.

CLASSIFICATION OF 435,200 ACCIDENTS OCCURRING  
IN 27 INDUSTRIES

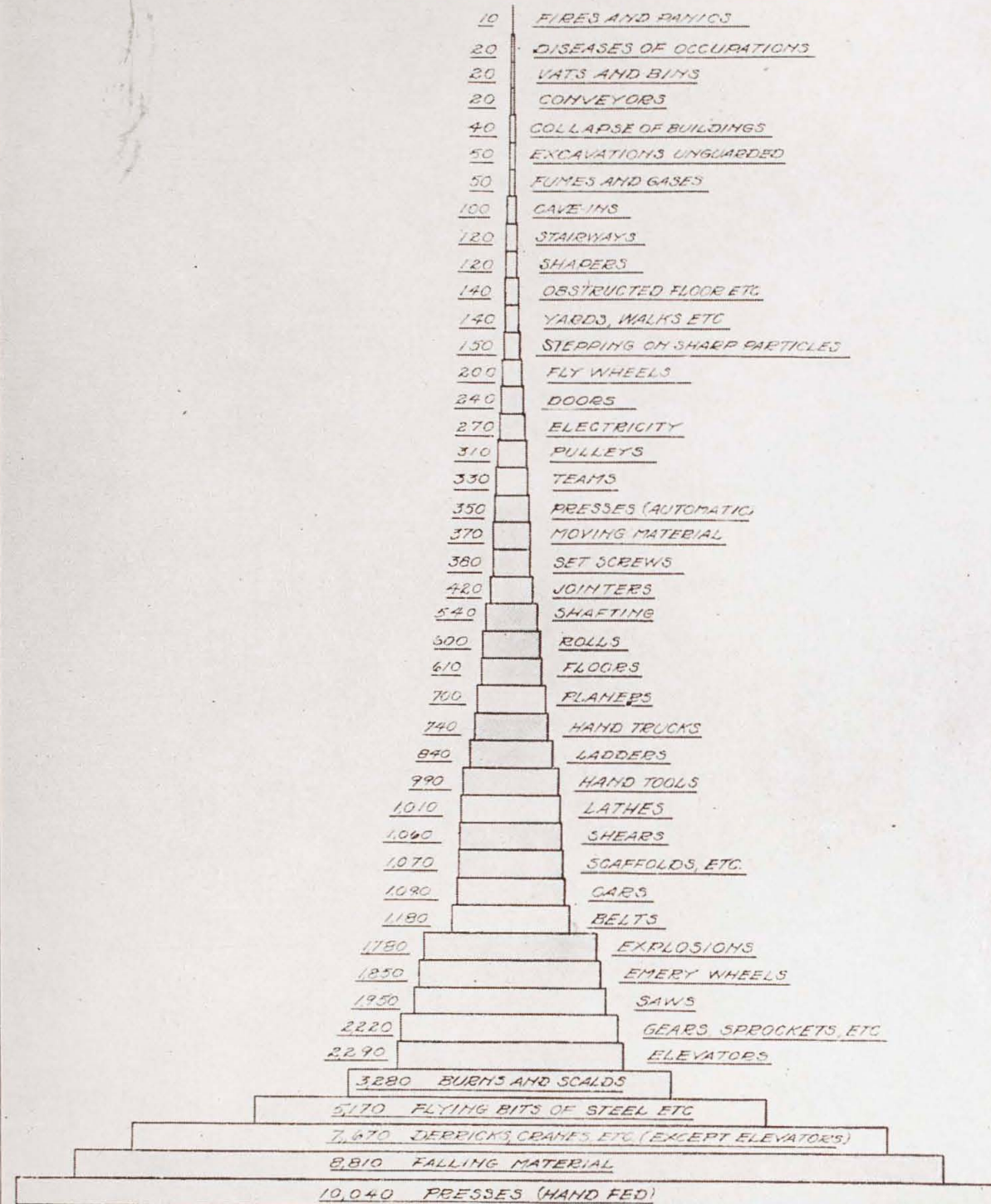


AETNA LIFE INSURANCE COMPANY  
LIABILITY DEPARTMENT

Fig. 30. Accident Statistics Chart.



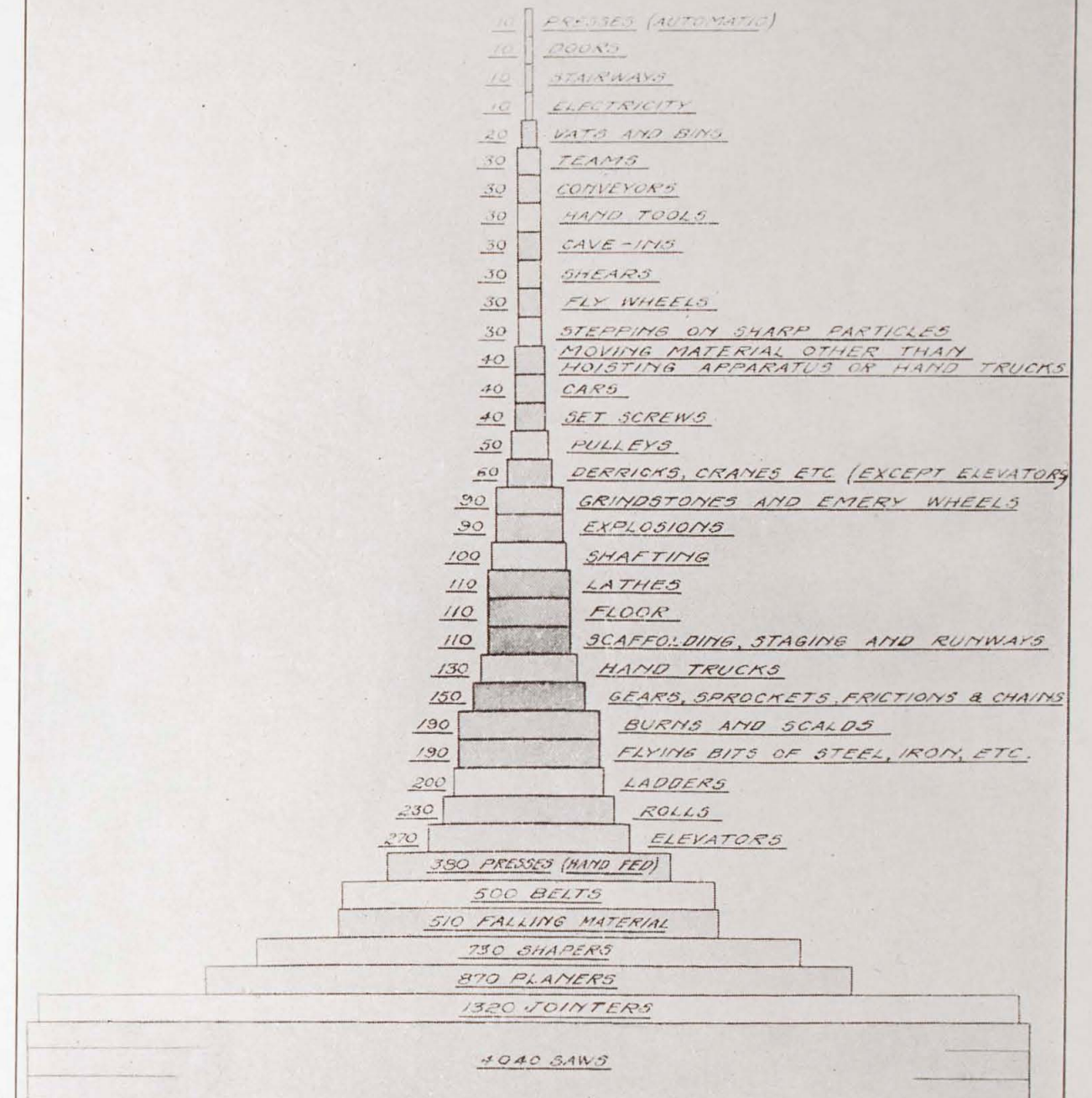
CLASSIFICATION OF 59,340 ACCIDENTS OCCURRING  
IN METAL WORKING PLANTS INTO 44 CAUSES



LIABILITY DEPARTMENT  
AETNA LIFE INSURANCE COMPANY

Fig. 31. Accident Statistics Chart.

CLASSIFICATION BY 37 CAUSES OF 10,820  
ACCIDENTS OCCURRING IN WOODWORKING PLANTS



AETNA LIFE INSURANCE COMPANY  
LIABILITY DEPARTMENT

Fig. 32. Accident Statistics Chart.



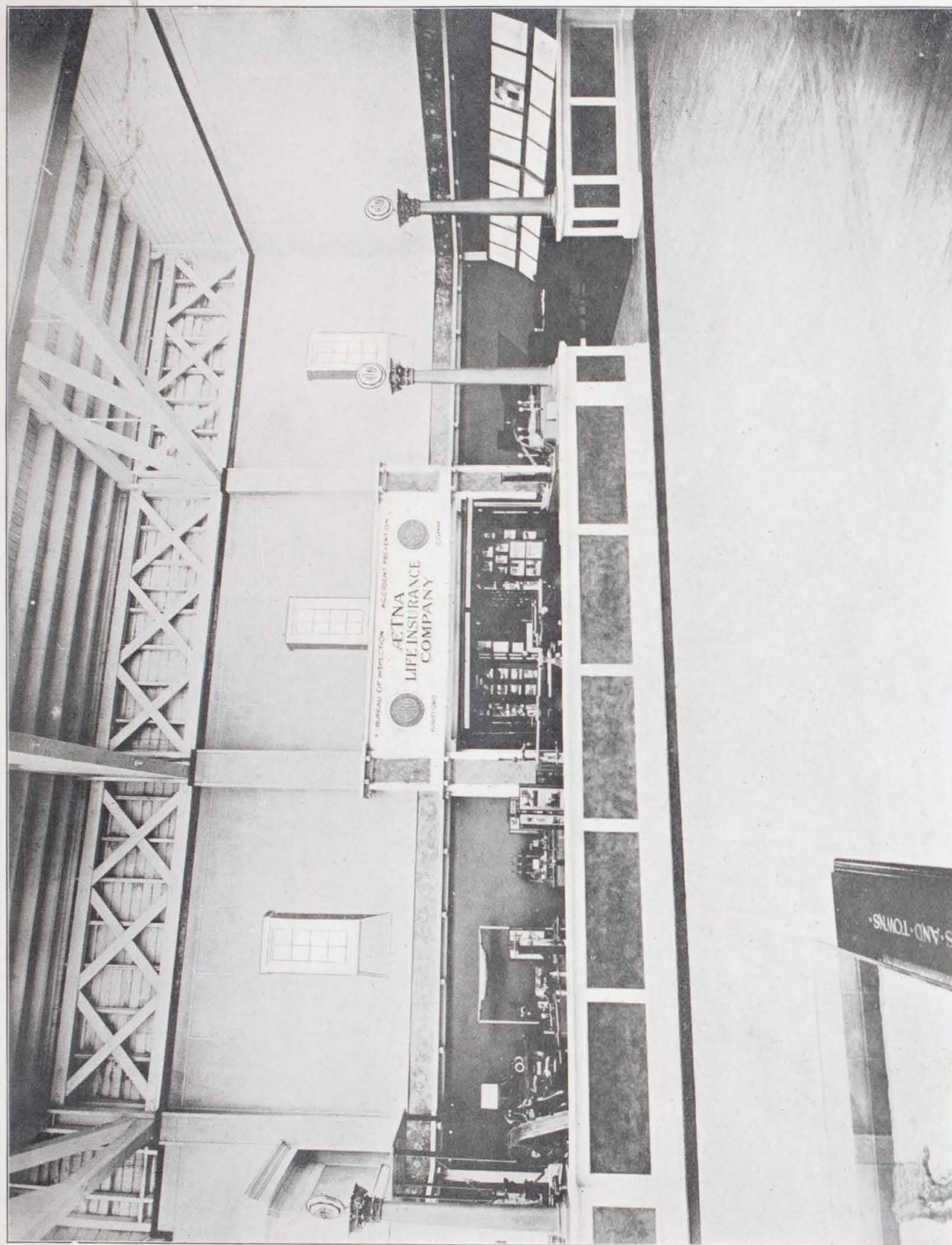


Fig. 33. Exhibit at San Diego.

## SAN DIEGO EXHIBIT.

Fig. 33 shows the Aetna booth at the Panama-California Exposition at San Diego. This exhibit, although not quite as extensive as the one shown at San Francisco, is full of interest and instruction to anyone mechanically inclined and at all interested in the work of preventing industrial accidents. In fact, it consists of practically the same features as those shown in San Francisco, except that the machinery frame is omitted and the model factory is replaced by a model engine (as shown in Fig. 34) run by a small electric motor. This model illustrates the complete guarding of the engine, belting, dynamo, switchboard, etc., found in an engine room.

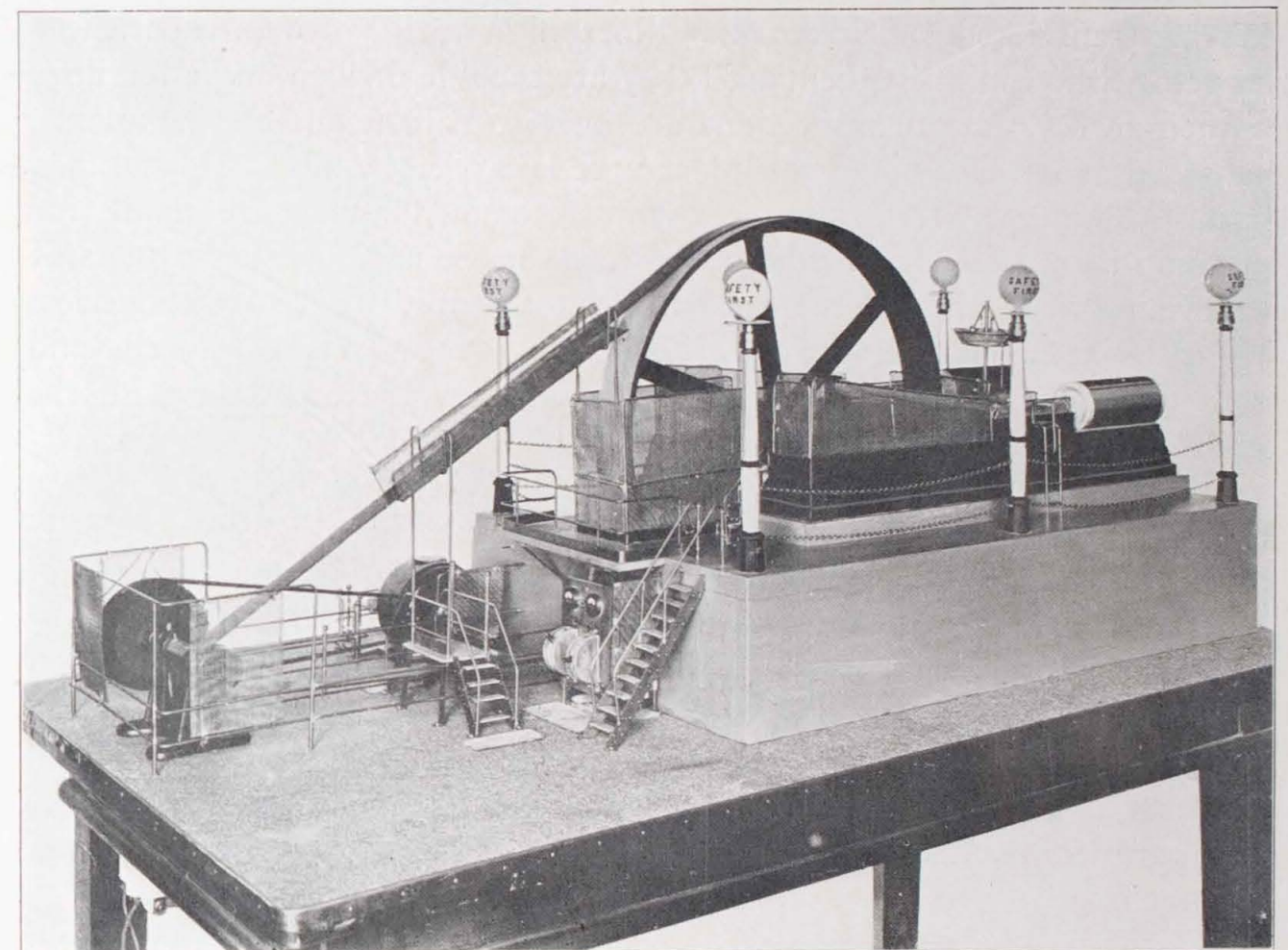


Fig. 34. Model of Guarded Engine Room.

## AETNA BUREAU OF INSPECTION.

Ever since the Aetna Life Insurance Company entered the liability insurance field, its Bureau of Inspection and Accident Prevention has vigorously promoted in every possible manner a carefully planned effort to reduce the enormous national waste due to industrial accidents. It has been the Company's belief that this is one of the important functions of a liability insurance company and one of the most valuable features of the service which it should render, in addition to protecting its assured against actual money loss on account of work accidents.

This belief was based on two general grounds: one that it is both the duty of the employer to prevent accidents to those in his employ and



also to his economic advantage, in view of the fact that accidents, as well as being costly, retard production; and the other, that it is both the privilege and duty of such an institution as an insurance company to make an active effort toward the conservation of human life and limb in industry.

Briefly summarized, the activities of the Inspection Department include:

First: The employment of a large force of inspectors, composed of men possessing considerable mechanical ability and having a thorough and practical knowledge of the construction and operation of all kinds of mechanical appliances. When first employed, these men receive a course of training in inspection work as conducted by the Company, after which they are transferred to field work and located in a field with an experienced inspector, who can assist them until they are capable of handling a territory of their own. Careful inspections are made of all manufacturing plants, elevators, mines, etc., upon which insurance is carried by the Company, dangerous conditions are pointed out and recommendations are made for guarding them. Recommendations are also made urging safe methods of performing work, the nature of which will not permit the use of safeguards. These recommendations are carefully gone over with the assured, and methods of building safeguards are explained by the inspector with the help of drawings and photographs. A complete copy of these recommendations is forwarded to the assured from the Home Office of the Company. If there is any doubt about any of the recommendations, a second, and, if necessary, a third visit is made by the inspector for the purpose of explaining more clearly any doubtful matters.

The chart shown in Fig. 35 and the table on the next following page give at a glance an idea of the amount of work done by this Bureau in 1914. They show that a total of 36,243 inspections were made, and that in the course of these inspections 107,753 dangerous conditions were noted and recommendations made. As a result, 57,383 of these danger sources were eliminated.

Second: The promotion through its field force, through the co-operation of the Company's agents and by direct work from the Home Office, of the practice of both organization and education in safety work. Not only is the great importance of organization and education impressed upon the Company's assured, but practical working plans of organization and methods of education are suggested and aid is rendered in carrying them out. When an organization plan is suggested, careful consideration is given to the size of the plant, so that the plan suggested may be the best adapted to it.

Third: Furnishing to the Company's assured, and to all others who may be interested, information regarding the best methods of accident prevention. This involves not only keeping in touch with developments in this country and gathering together the experience of other parts of the world,

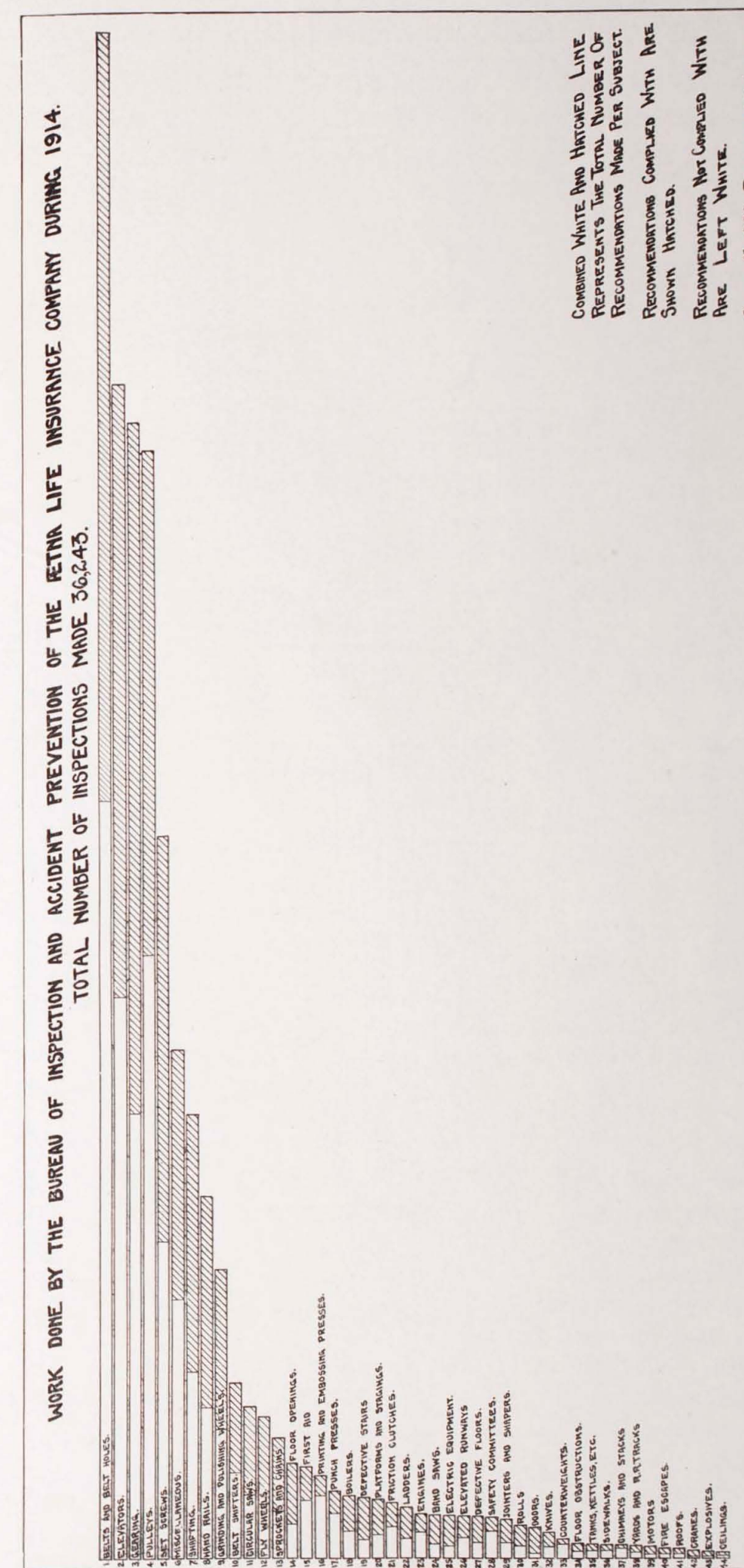


Fig. 35. Inspection Work Chart.



TABLE SHOWING RECOMMENDATIONS BASED ON ÆTNA  
INSPECTIONS IN 1914.

Subject of Recommendations.	Number of Recommendations Per Subject.	Number of Recommendations Complied with.
1 Belts and belt holes	18560	9583
2 Elevators	13886	7273
3 Gearing	13412	8145
4 Pulleys	13192	6046
5 Set screws	8583	4784
6 Miscellaneous	6094	2956
7 Shafting	5284	3069
8 Hand rails	4319	2532
9 Grinding and polishing wheels	3454	1921
10 Belt shifters	2101	1076
11 Circular saws	1817	1061
12 Fly wheels	1698	1046
13 Sprockets and chains	1444	873
14 Floor openings	1140	720
15 First aid	1094	396
16 Printing and embossing presses	991	236
17 Punch presses	809	269
18 Boilers	744	394
19 Defective stairs	722	505
20 Platforms and stagings	715	414
21 Friction clutches	657	285
22 Ladders	619	380
23 Engines	543	323
24 Band saws	525	356
25 Electric equipment	520	352
26 Elevated runways	514	261
27 Defective floors	513	309
28 Safety committees	510	157
29 Jointers and shapers	476	271
30 Rolls	414	253
31 Doors	387	314
32 Knives	314	167
33 Counterweights	229	54
34 Floor obstructions	186	101
35 Tanks, kettles, etc.	186	77
36 Sidewalks	172	67
37 Chimneys and stacks	158	15
38 Yards and railroad tracks	152	69
39 Motors	148	101
40 Fire escapes	129	76
41 Roofs	114	42
42 Cranes	94	66
43 Explosives	69	48
44 Ceilings	65	31
	107753	57383

but also contributing original ideas and adaptations evolved by the Company's own engineers. In connection with this work, the Bureau of Inspection and Accident Prevention issues bulletins containing valuable information as regards both safe methods of working and safety devices, and it has prepared and published a number of books and pamphlets on safety work which have been freely distributed. A few of these publications are shown in Fig 36.

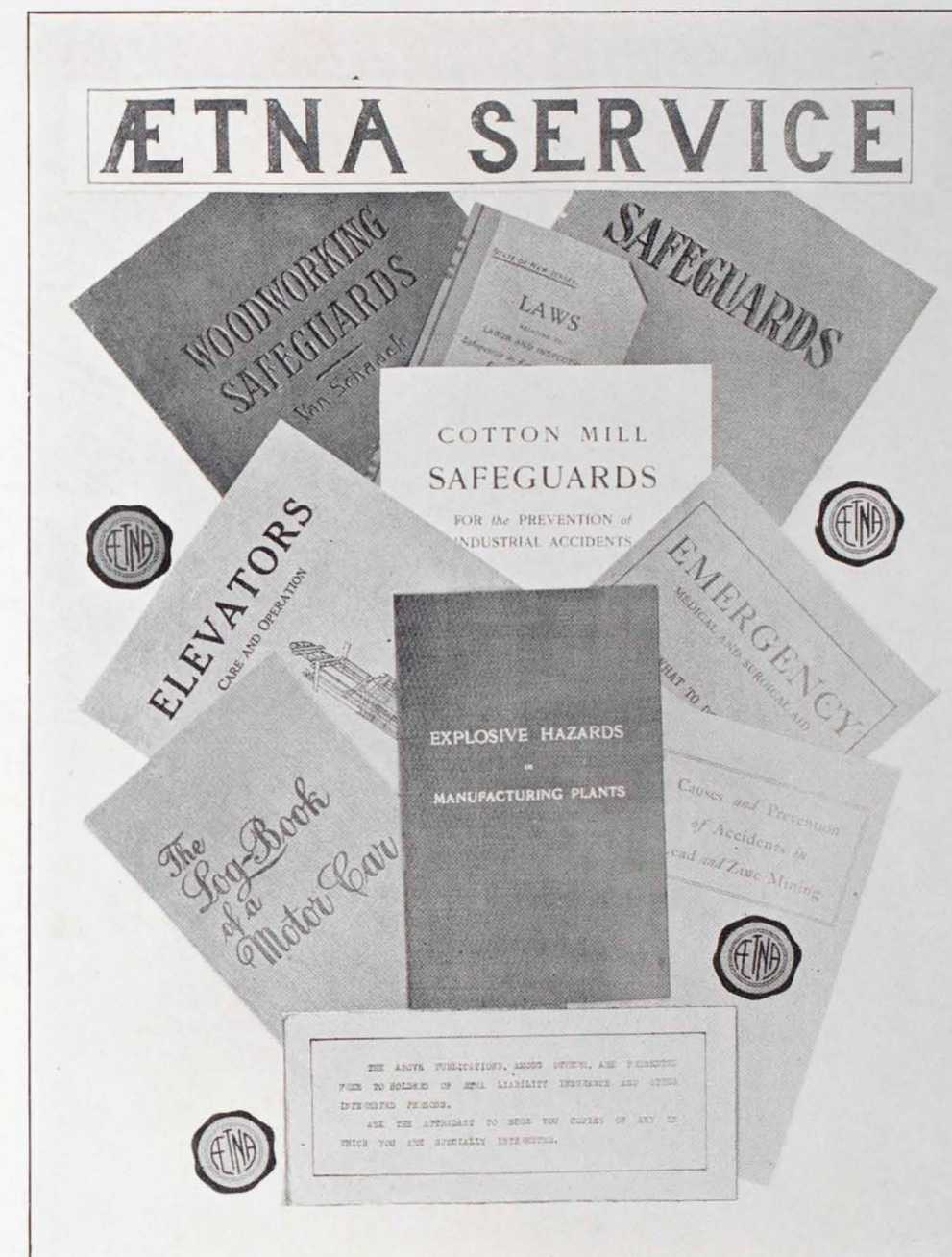


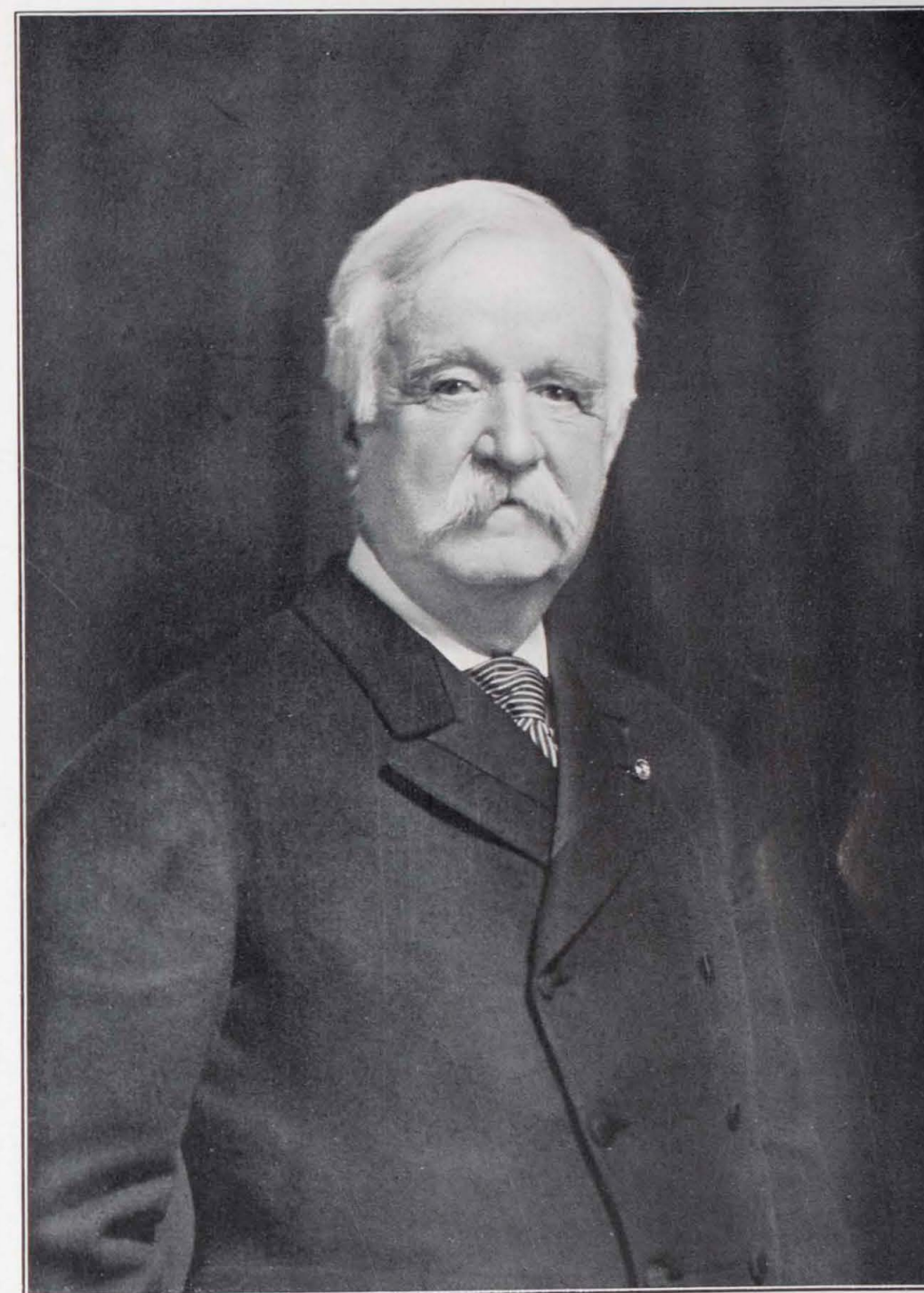
Fig. 36. Some Ætna Publications.

Fourth: A constant endeavor to stimulate interest, both general and special, in accident prevention through every available means. The Bureau has shown in various parts of the country a number of carefully prepared exhibits, and numerous illustrated lectures on safety and other subjects have been given by members of the Bureau before engineering clubs, chambers of commerce, gatherings of factory men, meetings of college students and at many conferences of organizations and individuals interested in the promotion of accident prevention.





HOME OFFICE  
AETNA LIFE INSURANCE CO., HARTFORD, CONN.



MORGAN G. BULKELEY  
President, Aetna Life Insurance Company



## 65th ANNUAL STATEMENT

of the

## AETNA LIFE INSURANCE COMPANY

CAPITAL STOCK, \$4,000,000

MORGAN G. BULKELEY, President

JANUARY 1, 1915

ASSETS		LIABILITIES	
Home office building .....	\$1,000,000.00	Reserve on life, endowment and term policies .....	\$91,065,454.00
Real estate acquired by foreclosure .....	\$29,143.33	Additional reserve, not included above .....	970,213.00
Real estate, supply department .....	75,000.00	Premiums paid in advance, and other liabilities .....	993,844.51
Cash on hand and in banks .....	4,120,758.13	Unearned interest on policy loans	320,820.99
Stocks and bonds .....	35,502,583.15	Taxes falling due in 1915 .....	697,242.31
Mortgages secured by real estate	58,206,405.74	Reserve for special class of policies and dividends to policyholders payable on demand .....	3,382,873.20
Loans on collateral .....	1,083,269.35	Losses and claims awaiting proof and not yet due .....	694,067.41
Loans secured by policies of this company .....	11,537,512.00	Unearned premiums on accident, health and liability insurance .....	3,313,361.36
Interest due and accrued December 31, 1914 .....	2,364,075.66	Reserve for liability claims .....	2,578,030.28
Premiums in course of collection and deferred premiums .....	2,596,276.76	Total	\$104,015,907.06
Amortized value of bonds and market value, December 31, 1914, of stocks, over book value, less assets not admitted .....	3,001,712.31	Surplus to policyholders amortized basis for bonds .....	15,500,829.37
		Surplus to policyholders, market values, June 30, 1914 .....	\$13,332,271.26
		Surplus to policyholders, market values, December 31, 1914 .....	12,838,035.26
Total Assets .....	\$119,516,736.43	Total Liabilities .....	\$119,516,736.43

Paid Policyholders since organization in 1850 . . . 263,717,904.00

## 8th ANNUAL STATEMENT

of

## THE AETNA ACCIDENT AND LIABILITY CO.

Capital Stock, - - \$1,000,000

MORGAN G. BULKELEY, President

JANUARY 1, 1915

ASSETS	LIABILITIES
Cash on hand and in Banks .....	Premium Reserve .....
Stocks and Bonds .....	Losses in Process of Adjustment ..
Mortgages secured by Real Estate ..	Commission Reserve on Premiums in course of collection .....
Loans on Collateral .....	All other Liabilities .....
Interest due and accrued, December 31, 1914 .....	Total .....
Premiums in course of collection ..	Surplus to Policyholders .....
Equity in funds of N. Y. Excise Re-Insurance Ass'n .....	
Total Assets .....	Total Liabilities .....

## 2d ANNUAL STATEMENT

of

## THE AUTOMOBILE INSURANCE COMPANY

OF HARTFORD, CONN.

Capital Stock - - \$300,000\*

MORGAN G. BULKELEY, President

JANUARY 1, 1915

ASSETS	LIABILITIES
Cash on hand and in Banks .....	Premium Reserve .....
Stocks and Bonds .....	Losses in Process of Adjustment ..
Mortgages secured by Real Estate ..	All other Liabilities .....
Loans on Collateral .....	Total .....
Interest due and accrued December 31, 1914 .....	Surplus to Policyholders .....
Premiums in course of collection ..	
Total Assets .....	Total Liabilities .....

\*On July 8, 1915, the capital was increased to \$500,000 and \$200,000 was added to the surplus.





# **ÆTNA CASUALTY INSURANCE**



## **LIABILITY LINES**

Employers'	Workmen's Compensation
Public (Direct)	Commercial
Public (Contingent)	Landlords' and House-
Elevator	holders'
Automobile	Physicians' and Surgeons'
Teams	Workmen's Collective

## **ACCIDENT LINES**

Personal Accident	Health	Disability
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## **OTHER CASUALTY LINES**

Automobile Collision	Plate Glass
Auto Property Damage	Burglary
Automobile Fire, Theft and	Flywheel
Transportation	Sprinkler Leakage
Automobile Combination	Water Damage
Teams Property Damage	Postal and Baggage
Elevator Property Damage	Combination Residence
Fire	

## **FIDELITY AND SURETY BONDS**

**ÆTNA LIFE INSURANCE COMPANY**  
**THE ÆTNA ACCIDENT & LIABILITY CO.**  
**THE AUTOMOBILE INSURANCE COMPANY of**

Hartford, Conn.





